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THE NAVY ENLISTMENT FIELD MARKETING EXPERIMENT

VOLUME III

AN EMPIRICAL INVESTIGATION

OF

NAVY RECRUITER PRODUCTIVITY

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This report is Volume 3 of a large scale field marketing experiment conducted over a three year period. This research was designed to measure and quantify where possible the effectiveness of Navy recruiting resources. A discussion of the problems and issues of salesforce productivity measurement begins this report. After presentation of the data on which the investigation is based, observed "learning" and "de-learning" effects are described. Other significant phenomena are also discussed, among them the effects of recruiting

goals, differences between regions and involuntary extensions of recruiters'
duty tours. The observed frequency distribution of recruiter productivity
is presented. This observed frequency distribution of recruiter productivity
is presented. This is followed by a discussion of recruiter performance
forecasting, and by suggestions for further research.

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A NAVY ENLISTMENT FIELD MARKETING EXPERIMENT

Guide to the Volumes of this Report

The Wharton Applied Research Center has prepared seven volumes of reports on the Navy Enlistment Field Experiment. The series begins with an overview and summary of hypotheses, experiments, and significant results. Volume II contains an integrated report on the experimentally-tested relationships between controllable marketing variables and Navy accessions. Volume III presents a related investigation of Navy recruiter productivity.

The remaining four volumes present descriptions and analyses of a "tracking" study designed to measure the relationships between demographic and "intermediate" attitudinal and perceptual measures and controllable marketing efforts.

The relationships between the various volumes are shown in the diagram. As an aid to the reader, a brief description of the contents of each volume is presented below.
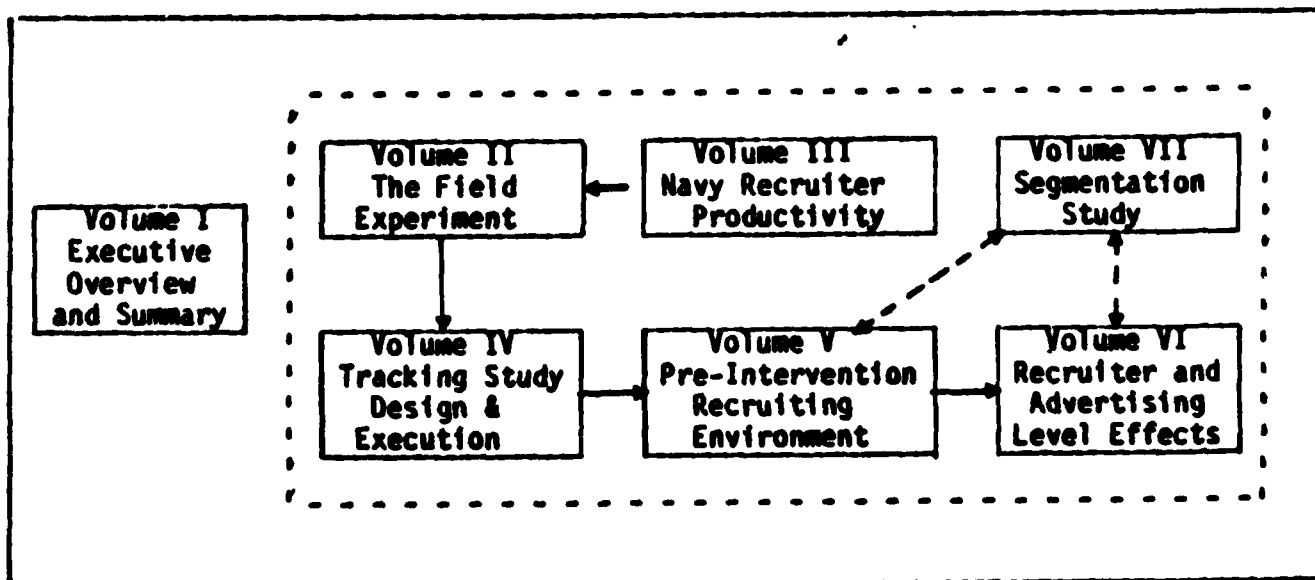
<u>Volume I. Executive Overview and Summary</u> - The background of the field

marketing experiment and tracking studies are presented in this volume, together

with a discussion of the experimental methodology and of the choice of measured

endogenous and exogenous variables. This is followed by a short description of

the collected data, and of the measurement techniques employed. Observed

responses to experimental and environmental variables are briefly presented.

This leads to an identification of the factors which affect military enlistments,

and to an estimation of the magnitude of their effects. The effects of key

marketing variables over time is examined. There follows a summary of supporting

data obtained through tracking studies of perceptions, attitudes and demo-

graphics. A conclusion discusses observed marginal costs and effects of various

treatments, and suggests implications for future resource allocation.

<u>Volume II. The Field Experiment: Design, Execution, Delivery and Analysis</u> -

This volume contains a detailed discussion of the background and objectives of

the research. The development of an appropriate experimental design, the

choice of variables and test markets, the levels of experimental treatments

and so forth is also discussed. The execution of the experimental protocol

is recounted. This is followed by a detailed description of the collected

data, and of analyses including aggregated ANOVA and a variety of multiple

regression models. An investigation of month-by-month response rates using

standardized log ratio analysis and monthly as well as cross-sectional time

series analysis is also reviewed.

<u>Volume IV. The Wharton-Administered Navy Tracking Study: Design and</u>

<u>Execution</u> - This volume outlines the rationale and methodology for collecting

and evaluating so-called "intermediate" measures of marketing effectiveness.

Selection of data collection vehicles, choic of measurement variables and

ranges and preparation of survey instruments are discussed. Response rates and other relevant details of the mechanics of data collection are outlined. An apppendix contains copies of the survey instruments.

Volume V. The Wharton-Administered Navy Tracking Study: Pre-Intervention Recruiting Environment - Demographic, attitudinal and perceptual data are presented in this volume (a) for the at-large population of young people, as sampled by telephone survey, and (b) for participants in the recruiting cycle itself, as sampled through written questionnaires. A baseline is thus established for understanding of further studies. The cross-sectional view of the recruiting process leads to insights into its mechanisms. Complete tabulations of the collected data are appended.

Volume VI. The Wharton-Administered Navy Tracking Study: Hierarchical Analysis of Recruiter and Advertising Treatment Level Effects - This volume focuses on measurement of changes in intermediate variables -- attitudes and perceptions -- which may be ascribed to military marketing activities. Difference across the experimental period are evaluated with respect to variations in advertising and recruiter strength levels. Cross sectional differences using post-experimental data are also examined. An appendix presents complete tabulations of the examined data.

Volume VII. The Wharton-Administered Navy Tracking Study: A Segmentation Approach - Multivariate cluster analysis has been applied to the collected attitudinal data to determine the nature and size of identifiable market segments and the at-large population of young people. This volume outlines the technique and results of the study, then evaluates the differential rates at which the observed segments proceed through the Navy recruiting

process. Differences which may be associated with variations in experimental treatment conditions are also identified.

1. EXECUTIVE SUMMARY

Key Findings of the analysis are summarized below.

1. <u>Job Tenure - A Learning Effect.</u> As expected, newly assigned recruiters require some time to reach the productive level of their more experienced counterparts. This may be due to on the job learning about the sales functions, to getting to know their territories and establishing a "pipeline" of candidates, or to personal adjustments and activities involved in moving to a new or different area. This learning seems to occur quickly and reach a near normal level within six months.

2. <u>Job Tenure - a "De-learning" Effect.</u> The new contract production of recruiters who are leaving recruiting duty for any reason declines to a level well below the level of their counterparts who are continuing in service. Some "short-time" effect was expected as departing recruiters prepared for their new roles and locations either in or out of the Navy. However, the decrease in new contract production is both longer in duration and steeper in magnitude than expected. A production fall off seems to begin at least 9 months prior to rotation, and to approach zero by the last three months of assignment. A suggested hypothesis postulates that recruiters nearing rotation begin to draw on their "inventory" of already signed people (those in the Delayed Entry Program - individuals who have signed contracts for future enlistment) to meet monthly shipping or enlistment quotas. Two adverse consequences would ensue if this hypothesis were confirmed. First, of course, a reduced number of contracts would be achieved than would otherwise be the case. Second, the new replacement recruiter enters the territory with a smaller DEP pool than would otherwise be the case.

3. <u>Frequency Distribution of Recruiter Production - a Bi-Modal Distribution.</u> This is the most intriguing result of this study. It

also must be interpreted most carefully. When recruiting tenure is held
constant (first year recruiters compared with first year recruiters, second
year with second year, etc.), the frequency distribution observed is quite
non-normal. Bi-modal distributions are observed in almost all cases. The
most notable exception is the distribution for the first six months of
recruiting service, which appears normal.

Further analyses which investigated recruiter and territory character-
istics did not provide a comprehensive explanation for this phenomenon.

4. The Impact of Goals - Two Indications. First, the progressive goal
structure seems to be more effective than the non-progressive one used in
Kansas City. In Kansas City, new recruiters had no goal or quota for new
contracts during their first month. They were then expected to achieve four
new contracts per month. Productivity stayed low for a longer period under
this structure.

Second, the goal seems to act as an upper bound during the second year of
recruiting service. This is especially noteworthy since the mean for "pro-
ductive" recruiters--the right hand mode of the bimodal production distribution
described above--is at its highest during the second year of recruiting service.

5. Forecasting Recruiter Performance - Transitional Probabilities.
Low performing recruiters during a single period (their first year of service,
for example) have a relatively high probability of remaining in the low
performance category during subsequent periods. This suggests the ability
to evaluate the performance of a recruiter or territory at an early point
in time and to effect appropriate changes.

High performing recruiters during a single period have a relatively low
probability of remaining in the high performance category during the next

period. This suggests that some type of incentive mechanism for high per-
formers may be desirable.

    6. <u>Implications for Analyzing Recruiter Importance - A Co-variate</u>.
Future work attempting to measure the impact of the number of recruiters on
the number of enlistments in a given market should include a co-variate to
account for recruiter "learning" and "de-learning". In the analysis of the
broader project to evaluate the effectiveness of various Navy recruiting
resources, we included not only the number of recruiters in a market but also
the percentage of those recruiters in their first four or last six months
of recruiting duty (see Wharton Applied Research Center report, Vol. 2 [1981]).

    7. <u>Subsequent Initiatives and Application of Findings</u>

    Several actions have been taken by the Navy Recruiting Command subsequent
to presentation of these findings. These actions include:

- *Incorporation of learning and de-learning measures into
  Navy Recruiting Command's goaling models*

- Close monitoring of DEP levels of rotating recruiters

- Introduction of a recruiter incentive plan--the Freeman Plan
  (See enlisted RETOPS Instruction Manual [1978]).

2. INTRODUCTION

    This report contains an analysis of the new contract production of
U.S. Navy recruiters during the period from May 1977 to December 1978. The
contracts analyzed are agreements to join the U.S. Navy as enlisted per-
sonnel (not including officers or officer candidates) for a specific tour
of enlistment varying from two to six years.

    The enlistee may elect to begin his tour of duty either immediately
or up to twelve months in the future. The beginning date is specified
in the contract and frequently depends upon the personal or educational

status at the time the enlistee decides to join the Navy. It may also depend on the training accommodations available for the particular military occupational specialty selected by the individual.

The analysis was performed as part of a broader project designed to evaluate the effectiveness of various Navy recruiting resources (see Wharton Applied Research Center report, Vol. 2 [1981]). One important resource is, of course, the number of recruiters assigned to any market. The effect of a given number of recruiters in a given market will also depend on many other variables. These variables include the individual characteristics of the recruiters observed, their level of training, and their previous work or Navy experience, among others.

Of particular interest to us, in the context of a broader evaluation, was the effect of job tenure on recruiter performance. This variable was highlighted because the recruiter force of the Navy is designed to be in continual rotation. Recruiting duty is a shore duty assignment for Navy personnel. Assignment is made for a pre-specified period of time - generally about three years. As a result, a large percentage of the recruiter force is rotated during each calendar year.

There are two implications of this policy on our work. First, changes in the recruiter force level tend to be executed within this policy. As a result, additional or incremental recruiting manpower is usually achieved by increasing the number of incoming recruiters (with no job tenure in recruiting) in a market. Reduced or decremental recruiting manpower is generally achieved by not replacing recruiters whose tour of duty is expiring. Hence, changing levels of manpower are frequently accompanied by a changed job tenure profile for markets observed. These two factors are confounded in any subsequent analysis.

The second implication is that even when no changes in manpower level are desired, the job tenure profile for any market changes over time. The rotation of recruiters is not spread evenly over time or between markets. Again, an analysis of recruiter productivity, either between markets or in the same market over time, will confound the effect of the amount of the recruiter resource (the number of recruiters) with the effect of job tenure (recruiting experience), if job tenure is of any significance.

The present work was undertaken to determine the effect of job tenure on recruiter productivity, and to see if a useful co-variate could be found to account for it in future analyses.

As the work progressed, a number of other interesting phenomena were observed and are reported here as well.

3. ISSUES AND PROBLEMS IN SALESFORCE PRODUCTIVITY MEASUREMENT

Meaningful analysis of salesforce productivity has been elusive because of problems in measuring productivity in general. In this section we shall briefly discuss the issues and problems related to the measurement of sales-force productivity, and then consider these issues in the context of the U.S. Navy Recruiting Force.

The first problem encountered is the accurate measurement of the end-product of selling effort--sales. For firms producing multiple products, it is not clear that sales generated by a salesman can be usefully aggregated by summing the monetary value of sales across all products. Further, different customer groups may be of different importance to the firm, so that it may be difficult to aggregate sales from different groups to represent the "total sales" generated by the salesman. For example, three different groups of customers are identified in the marketing literature (see Parasuraman and Day [1977]): 'direct'

customers from whom direct purchases are generated; 'indirect' customers
that are mostly retailers; and 'national' accounts that the salesman may not
have great direct influence on the volume of purchases by these accounts.
Equilibrating sales under these circumstances can then be difficult.

The issue of repeat purchase sales has also complicated the measurement
of salesforce productivity. When repeat purchase sales constitute a large vol-
ume of the total sales, the actual sales generated by a particular salesperson
may be masked. Moreover, the measurement of salesforce productivity could
further be biased when repeat purchases are present, as it may be harder to
get a new customer than to hold on to an existing one (Brown et.al. [1956]).

Other factors that affect salesforce productivity include goals, quotas,
and pay or compensation plans (Doyle and Shapiro [1980] and Winer and Schiff
[1980]); the differing prices and terms of payment that salesmen can offer to
the customers (Lambert [1968]); self pre-selection of salesmen (Darmon [1978]);
the differing degrees of competition faced by the salesforce in terms of
prices and position (Ryans and Weinberg [1979]); and the environment or
organizational climate under which the salesforce operate (Pruden and Reese
[1972], Churchill et.al. [1976], and Bagozzi [1978]). These factors have to
be accounted for to accurately assess sales productivity.

Characteristics of sales people have also been considered to be important
in affecting salesforce performance (Bagozzi [1978], Cravens and Woodruff
[1973], Cravens, Woodruff and Stamper [1972], Beswick and Cravens [1977],
Parasuraman and Day [1977], and Ryans and Weinberg [1979]). Of these charac-
teristics, the experience of the salesman has been held to be of special
importance (Jolson [1974]).

Finally, the measurement of salesforce productivity can not be accurate
without taking into account the territorial differences that may exist.

Researchers have found such differences to be significant factors that affect salesperson performance (Lucas et.al. [1975], Cravens, Woodruff and Stamper [1972], Beswick and Cravens [1977], and Ryans and Weinberg 1979]).

The above issues are usually difficult to resolve due to the nature of the product, the lack of data, and/or the small sample sizes of the data, even if they do exist. These difficulties have led practitioners to make sweeping, often unrealistic assumptions such as "competitive situations in all territories being relatively equal" (Semlow [1959]), and "all salesmen are of equal ability, ..., etc.," (as pointed out by Montgomery and Webster [1968]).

The U.S. Navy Recruiting Force provides a unique case in which many of these issues or problems are substantially ameliorated. First, there is a clear definition of "sales", the number of contracts signed which can be accurately measured and aggregated. Second, we find minimal self-selection of "salespeople" in this case. We can reasonably assume that individuals do not join the Navy primarily to become salesmen and note that most recruiters are assigned to their recruiter duty. Repeat purchases are also minimal. The percentage of Navy contracts signed between October 1975 to September 1978 in 50 ADI (Areas of Dominant Influence) that have prior service experience averages only about 7% (see Appendix 1 for a detailed breakdown). The Navy Recruiting Force also faces relatively uniform competition from its counterparts in the Marines, Air Force, and Army. The contracts generated are also of relatively uniform "prices" (wages and positions) and terms. Moreover, the Navy Recruiting Command also tries to set up recruiting territories that are roughly equal in their potentials. Hence, many of the confounding issues discussed above are either absent or largely reduced. Finally, because of the policy of rotating recruiters on a three year basis, a large independent

sample of recruiters is available, enabling a detailed and in-depth analysis of recruiter productivity.

4. DATA FOR THE PRESENT STUDY

The data used for this analysis is derived from the PRIDE data base system of the U.S. Navy Recruiting Command. Data regarding each individual who signs an enlistment contract is entered on a computer record in this system. Among the data is the social security number of the recruiter entering the contract, tracing this aspect of recruiter productivity.

As a first step, a program was run to calculate the number of contracts submitted monthly by each recruiter from May 1977 to December 1978. Recruiter data was obtained for each of three Navy Recruiting Districts. (There are a total of 43 such Navy Recruiting Districts in the U.S.) Data on all of the recruiters in the three NRD's was obtained.

The specific districts examined were Albany, New York; Atlanta, Georgia; and Kansas City, Missouri. These districts were selected on a basis of both geographical dispersion and past performance, i.e. one was perceived as a good district which historically met goal, one as an average district and one as a poorer district.

Next, the dates of assignment and rotation (if any) were requested for each recruiter included in the above report. Some editing was necessary at this point to account for transposition errors in the entry of recruiters' social security numbers. As an example, recruiter Jones may have social security number 123-45-6789. New contracts could have been reported for both that number and 213-45-6789 when the computer files were developed for particular individuals. Of course when dates of assignment were requested

nothing would appear for the latter number. A number of such obvious trans-
position errors were found in the original data and were edited accordingly.

The data was then deseasonalized based on seasonal indices obtained
from a study by Ritz (1979). These indices were computed according to the
method of ratio to twelve-month moving average (RTMA). Table A1.2 in Appendix
1 shows the seasonal indices used for the present study. Finally, the data
was arranged by job tenure instead of calendar month so that each recruiter's
first month could be compared with each other recruiter's first month, etc.

A total of 345 recruiters were observed, which represents approximately
10% of the total recruiting force of the Navy. Of course many combinations
of job tenure were observed in this data. Some recruiters were observed in
their second and third years. Others in their first. Some began their
tours during the period, while others ended theirs. We are therefore able to
simulate longitudinal data from the observed cross section. Tables detailing
the sample used for the analyses supporting each figure in the report are
given in the appendices.

5. ANALYSIS

5.1 The Learning Effect of Recruiters

This analysis began with a description of the average monthly productivity
of recruiters during different periods of time of their tour. The time-
frame variations represent the different levels of experience as reflected by
the recruiters' individual length of tour to date. Figure 1 shows average
monthly productivity at the various experience levels.

Figure 1

PRODUCTIVITY CURVE OF RECRUITERS

AVERAGE MONTLY CONTRACTS

MONTHS OF SERVICE FROM STARTING DATE
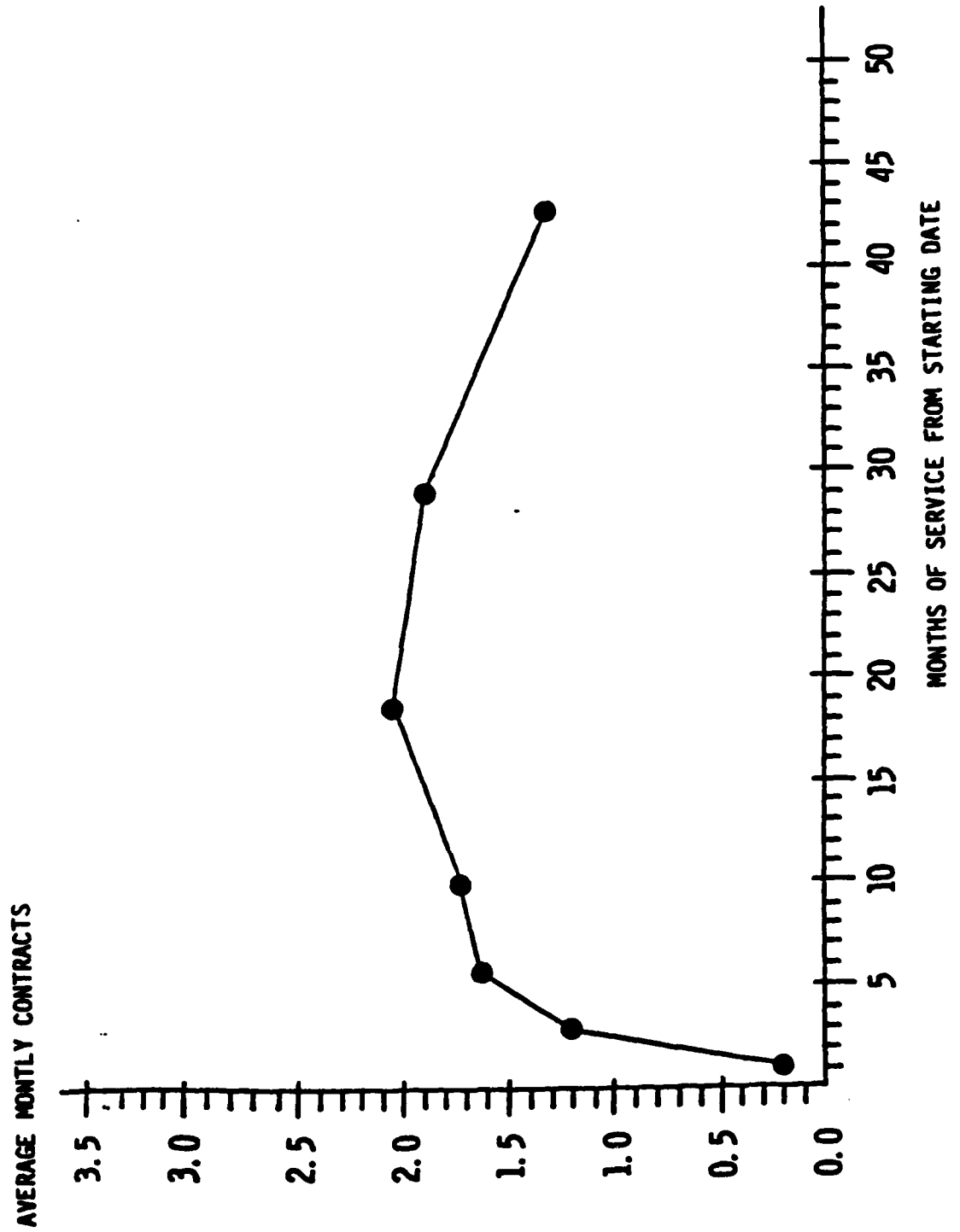
During their first month of assignment, the average monthly contracts per recruiter is 0.2. The average monthly contracts rises to 1.2 in the second and third months, to 1.65 in the fourth to sixth months, and to 1.7 in their seventh to twelfth months of service. After the first year of service, the average monthly contracts stabilize at around the level of two per recruiter per month. Average monthly production drops, however, after about three years. The average monthly contracts during the recruiters' fourth year and beyond is 1.3 per recruiter per month.

These observations show that the newly assigned recruiters require about four months to reach the average production level of their more experienced counterparts. Once this level is reached, production stabilizes. Thus productivity does not seem to be a function of experience after the initial four months.

The decline after three years is unexpected and counter-intuitive. As mentioned earlier, the normal tour of duty for a recruiter assignment is about three years. It is our understanding that, in general, only recruiters who have consistently demonstrated above average performance are permitted to extend their assignment tour for additional periods. Hence, lower overall performance for these selected recruiters is unexpected. This decline after three years has to be analyzed by identifying those recruiters whose productivity drops. It was hypothesized that the class interval of "over 3 years' service" had a disproportionately large composition of re-cruiters whose recruiting tour ended during the observation period. Hence, we examined the productivity of recruiters in the last months of their re-cruiting duty to see if this period could provide insight into the decline in productivity after three years.

5.2 The "De-learning" Effect of Recruiters

Figure 2 shows the average monthly contracts per recruiter at a given number of months prior to their termination from recruiting duty. The average production per month remains at the level of two about a year before they leave recruiting service. Productivity, however, declines steadily after that until the last three months when the average production per month is virtually zero. This phenomenom is similar to the "decline" stage of a salesman in Jolson (1974), and the "forgetting" stage described in Carlson and Rowe (1976).

This profound "de-learning" effect of recruiters may be responsible for the decline of productivity after the third year as observed in Figure 1. Indeed when we exclude all data of the last six months prior to a recruiting tour termination date we find that the declining portion of Figure 1 is removed. Figure 3, the productivity curve with the de-learning effect eliminated by the above method, illustrates this point. In this case, we still observe rapid "learning" in the first four months, after which there is very small month-to-month variation in performance.

A second phenomenom worth noting in Figure 3 is the apparent trend which developed between months 29 and 39. This may further indicate that different behavior patterns emerge when the recruiter is scheduled for rotation. It can be hypothesized that recruiters begin to draw from their inventory of D.E.P. contracts to meet their monthly shipping targets. They therefore reduce their own inventory of D.E.P. contracts and must play "catch up ball" in the first few months after tour extension. Knowledge of when recruiters were notified of their tour extension could help to test this hypothesis.

Figure 2

18 MONTHS DE-LEARNING CURVE

AVERAGE MONTHLY CONTRACTS
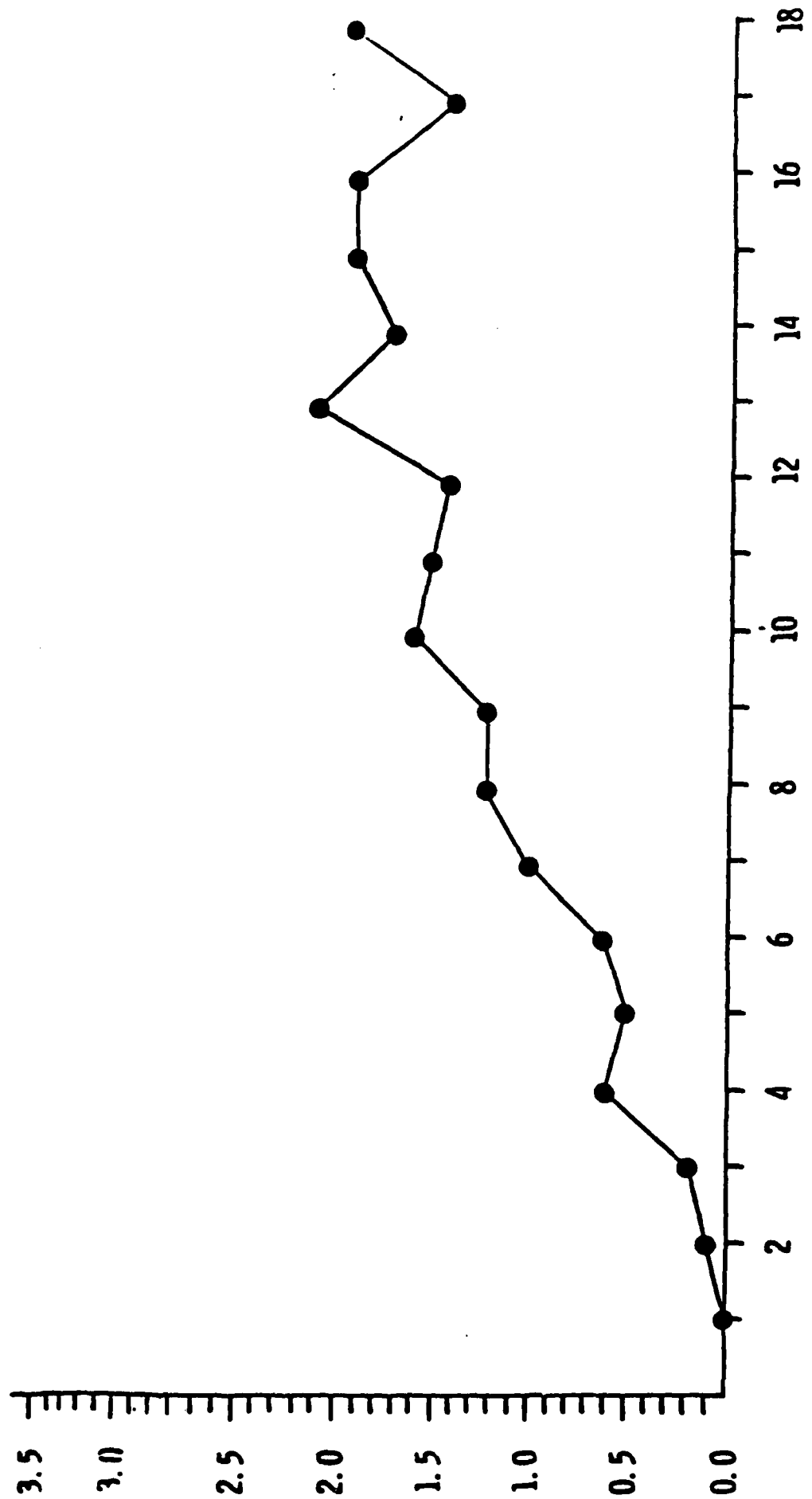
NUMBER OF MONTHS PRIOR TO TERMINATION DATE

Figure 3

48 MONTHS PRODUCTIVITY CURVE WITH DE-LEARNING EFFECT ELIMINATED

AVERAGE MONTHLY CONTRACTS

MONTHS OF SERVICE FROM STARTING DATE
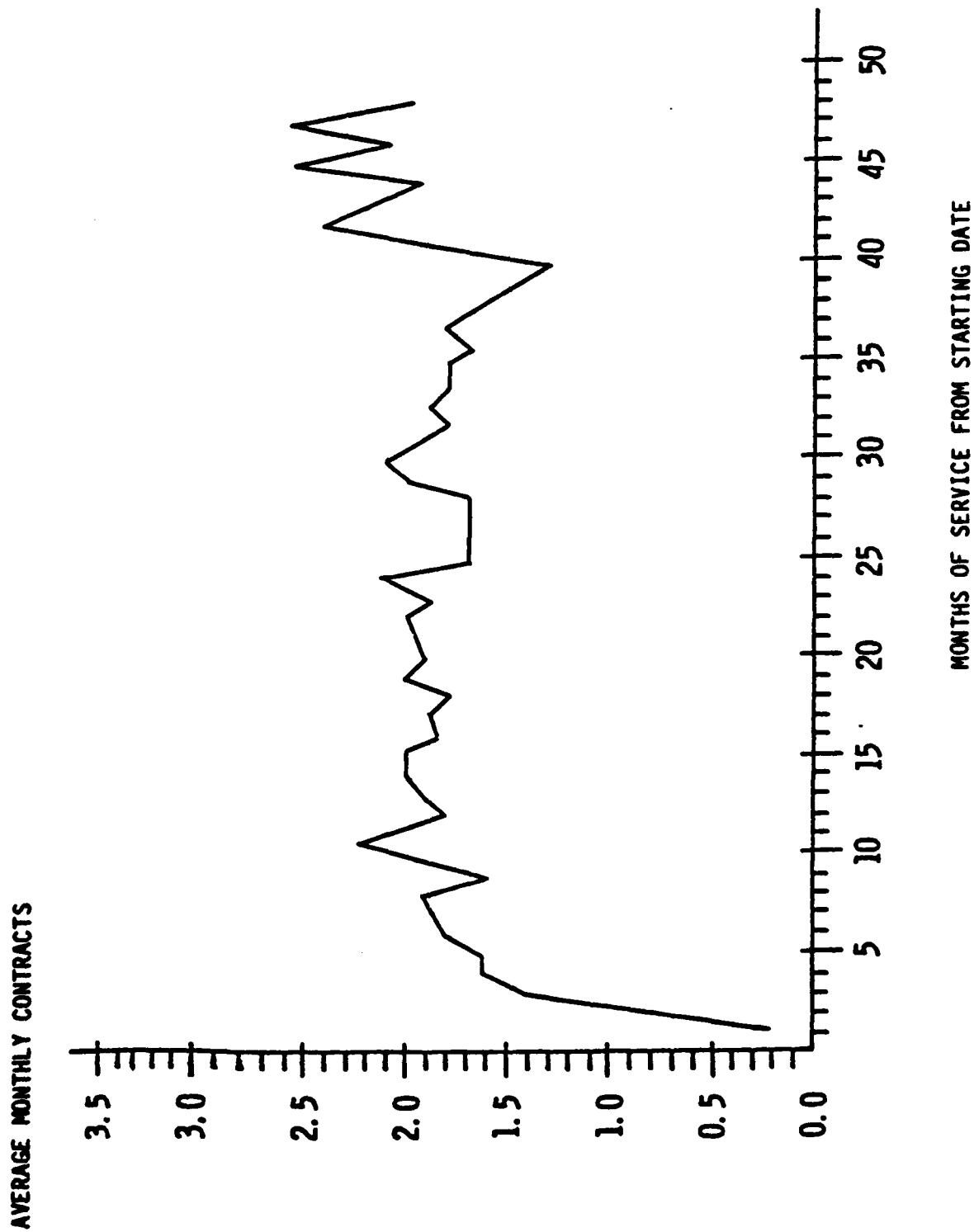
5.3 Frequency Distribution of Recruiter Production

Figures 4, 5, 6, and 7 show the frequency functions of average monthly contracts produced by recruiters in their first, second, third, and fourth year of service, respectively. Again, any data from the last six months before the termination date of any recruiter was excluded.

The common feature of all these frequency functions, except for the first year, is the bi-modal nature of the functions. The left-hand modes, as shown in the figures, are always less than one monthly contract. The right-hand mode shifts progressively rightward as the level of experience increases from one to two years. This right-hand mode remains the same in the second and third year, which agrees with our finding in the previous sections. In the fourth year we find more recruiters producing more than four contracts per month.

Figures 8 to 15 elaborate the frequency functions further by considering recruiter performance semi-annually. The bi-modal nature is still observed except for the first six months frequency function, which appears to be normal.

To investigate further the nature of the frequency distributions of recruiter productivity in their respective years, we performed statistical tests to see if these distributions were significantly different from the normal distributions. Table 1 gives some descriptive statistics of the distributions of recruiter productivity in their first, second, third, and fourth year of service. The first year has been split into two halves because the first six months coincides with the learning period for recruiters and appears to be different in character than the second six months.

The five distributions were tested against the normal distributions with the same respective means and standard deviations, using the modified Kolmogorov-Smirnov test of distributions (see for example, Conover [1971] and Lilliefors (1967]). Details of the statistical tests are given in Appendix 3.

Figure 4

FREQUENCY FUNCTION OF RECRUITER PRODUCTIVITY IN THEIR

FIRST YEAR OF SERVICE
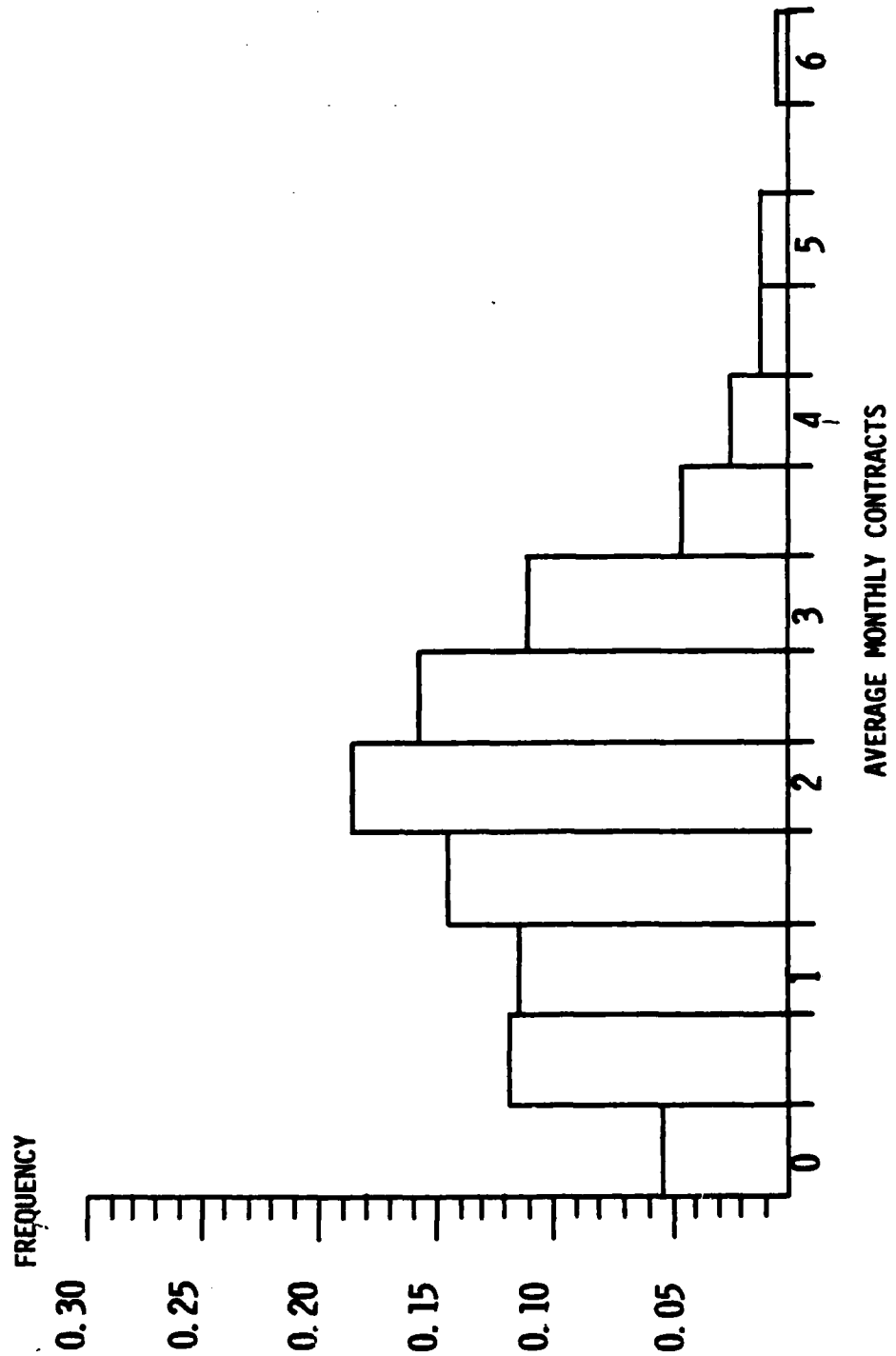
Figure 5

FREQUENCY FUNCTION OF RECRUITER PRODUCTIVITY IN THEIR

SECOND YEAR OF SERVICE
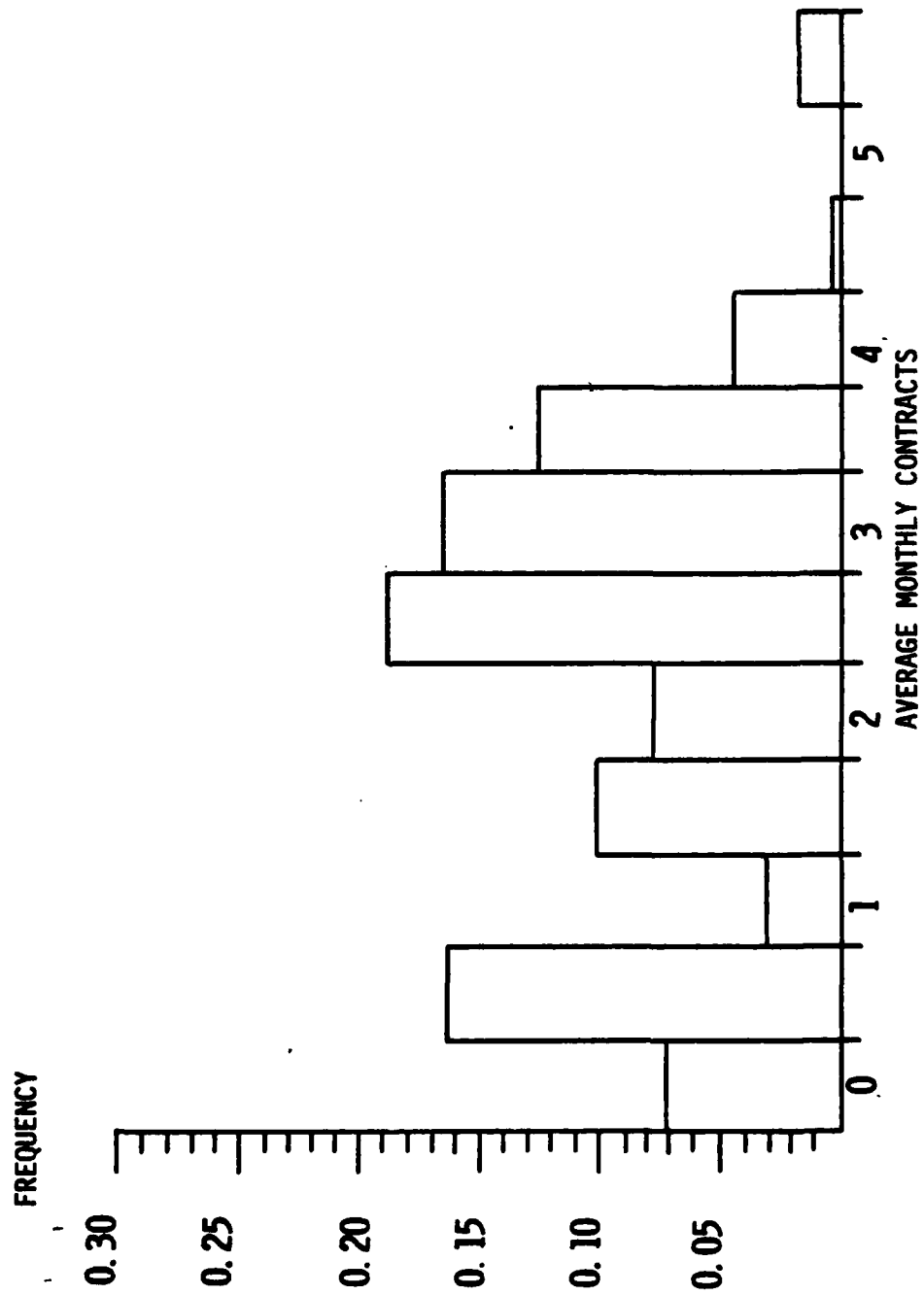
Figure 6

FREQUENCY FUNCTION OF RECRUITER PRODUCTIVITY IN THEIR

THIRD YEAR OF SERVICE
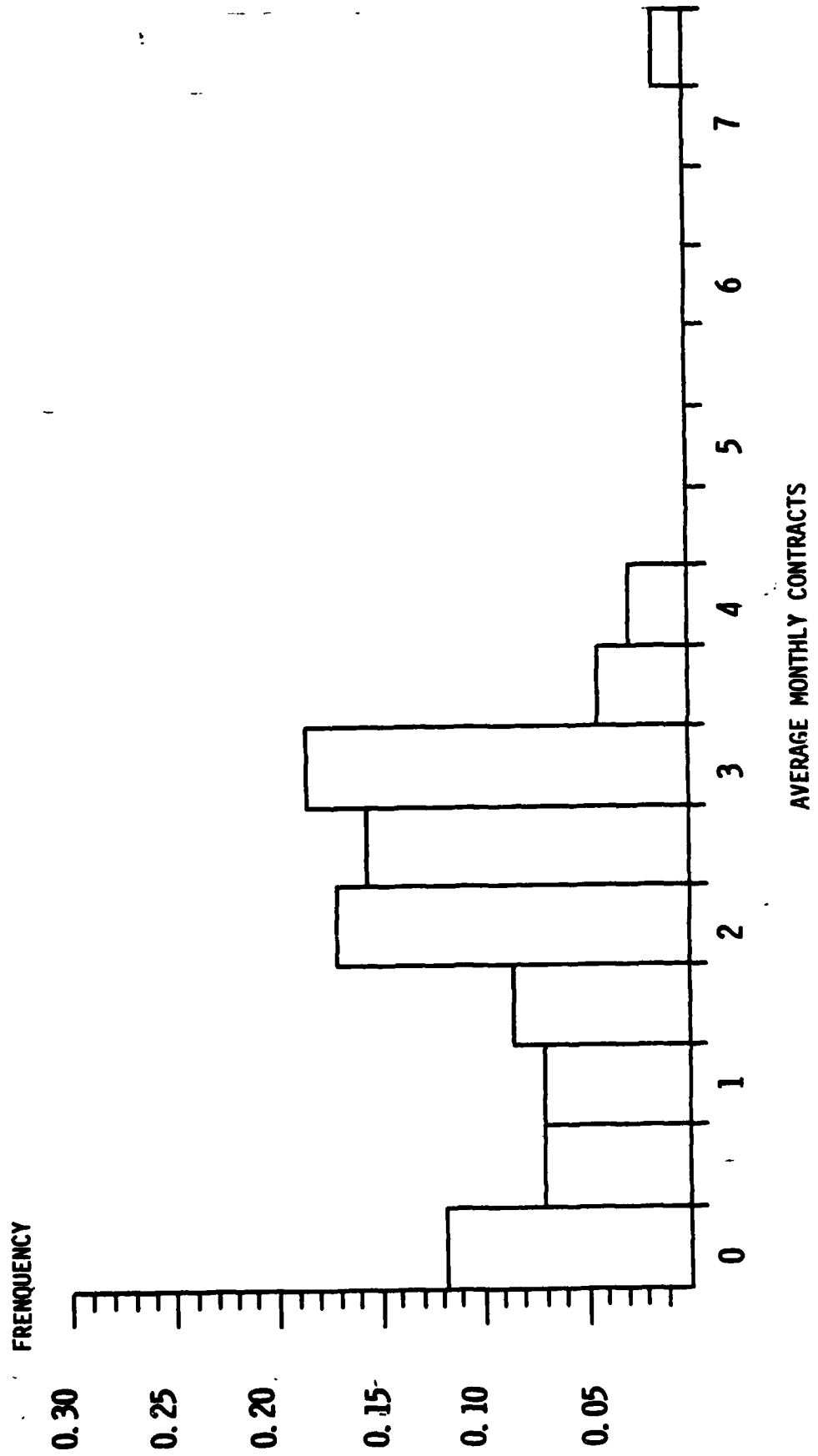
Figure 7

FREQUENCY FUNCTION OF RECRUITER PRODUCTIVITY IN

THEIR FOURTH YEAR OF SERVICE
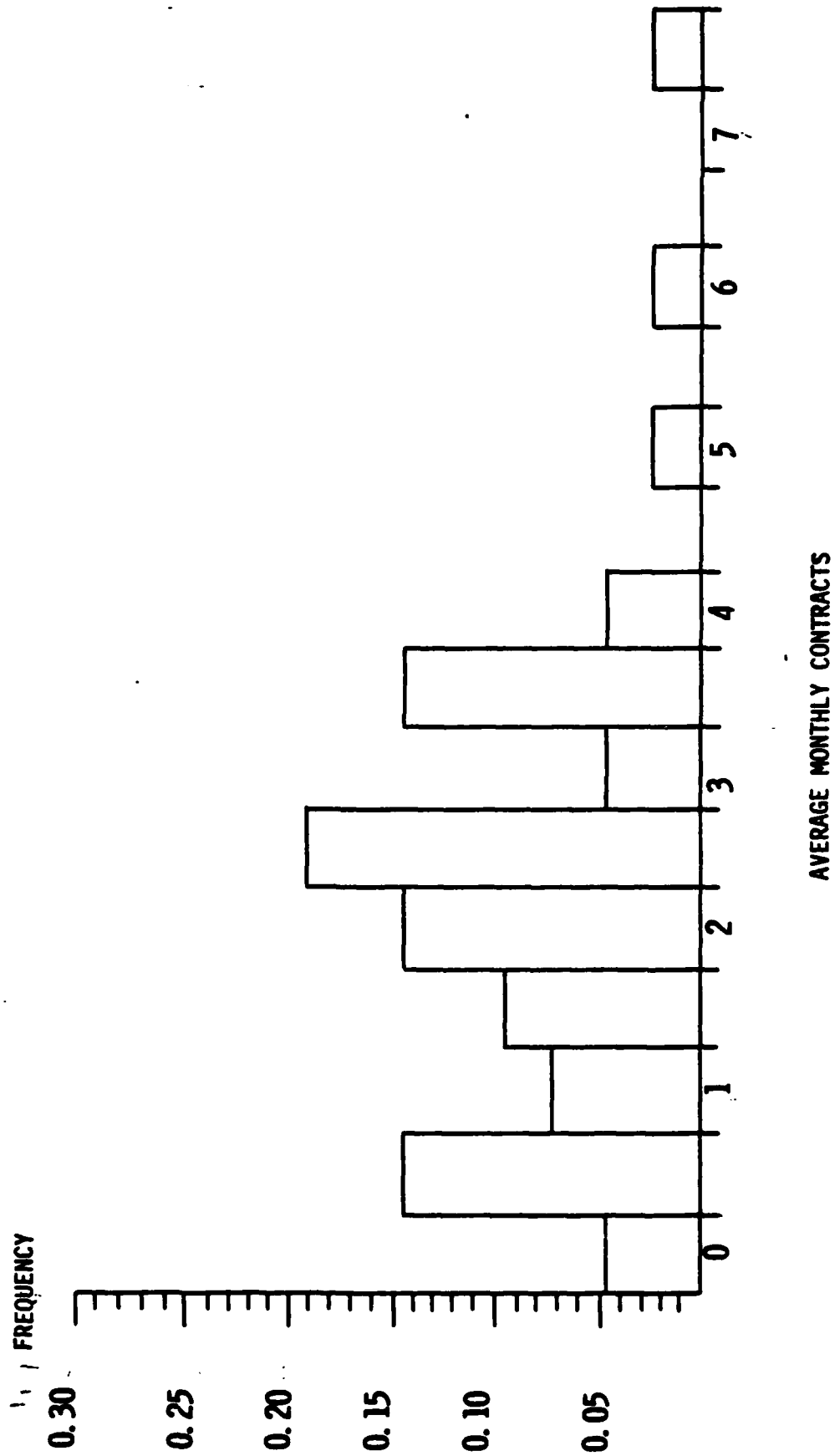
Figure 8

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS PRODUCED
BY RECRUITERS DURING THEIR 1-6 MONTHS OF SERVICE
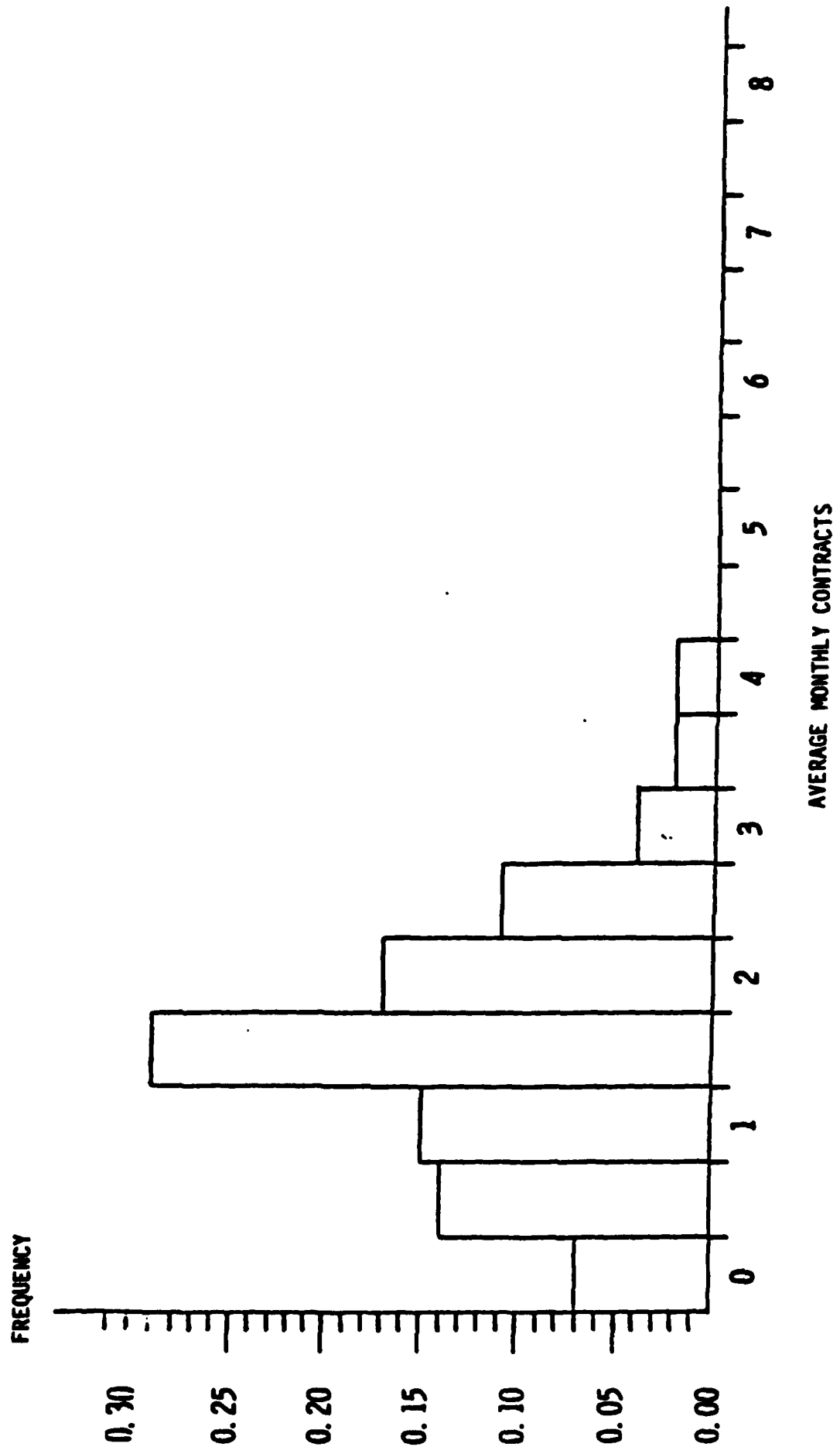
Figure 9

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS PRODUCED
BY RECRUITERS DURING THEIR 7-12 MONTHS OF SERVICE
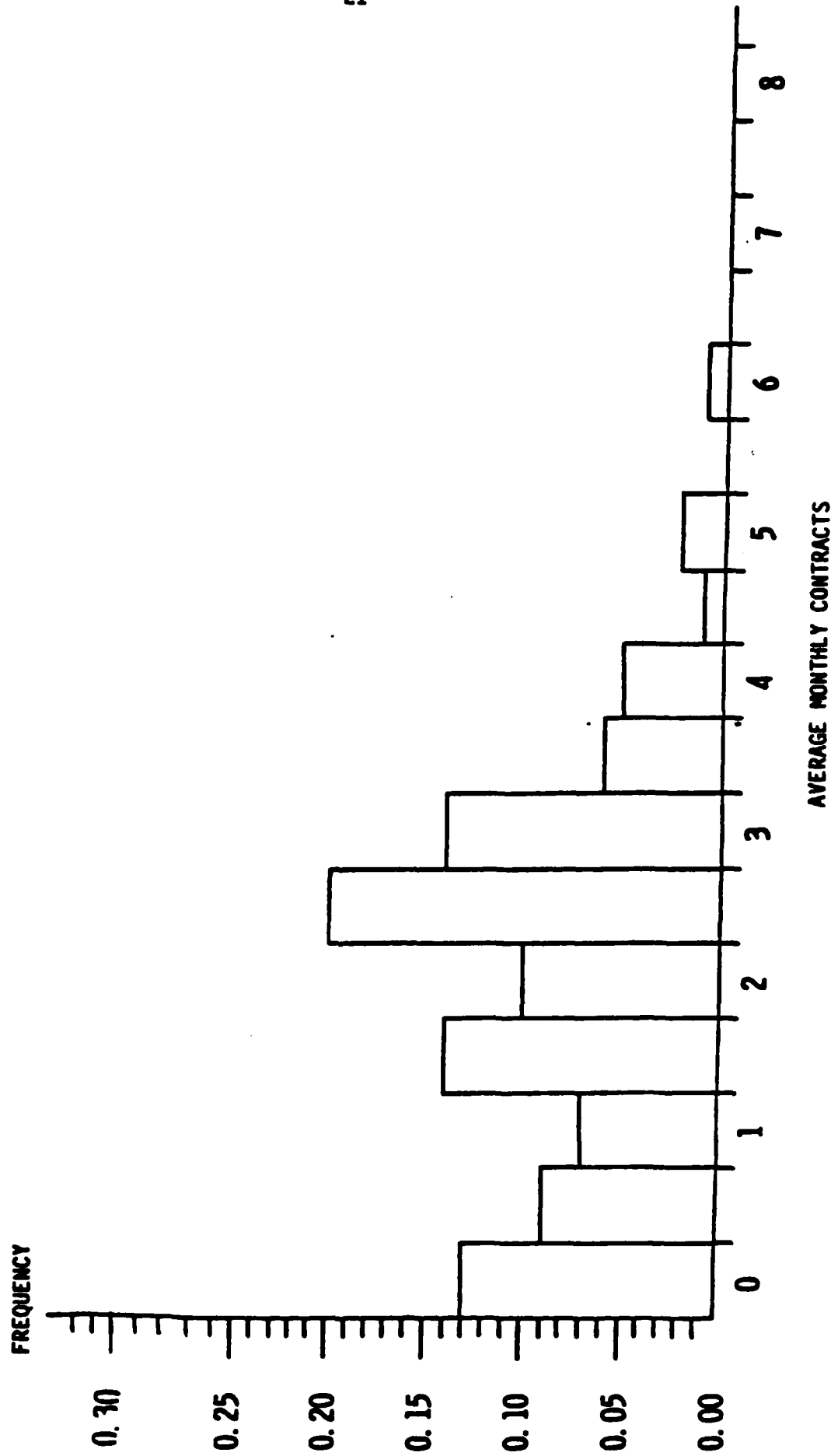
Figure 10

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS PRODUCED
BY RECRUITERS DURING THEIR 13-18 MONTHS OF SERVICE
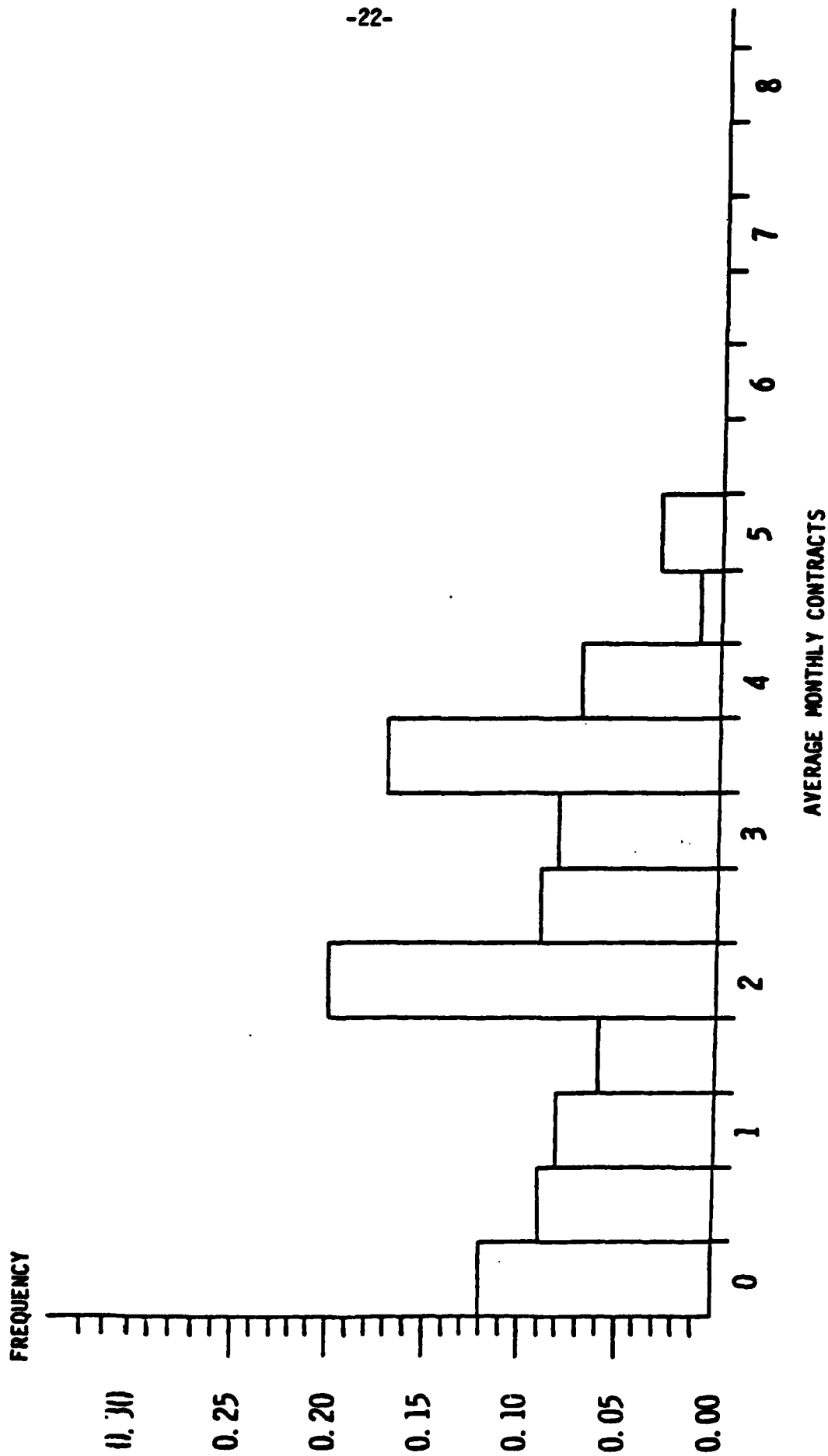
Figure 11

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS PRODUCED
BY RECRUITERS DURING THEIR 19-24 MONTHS OF SERVICE
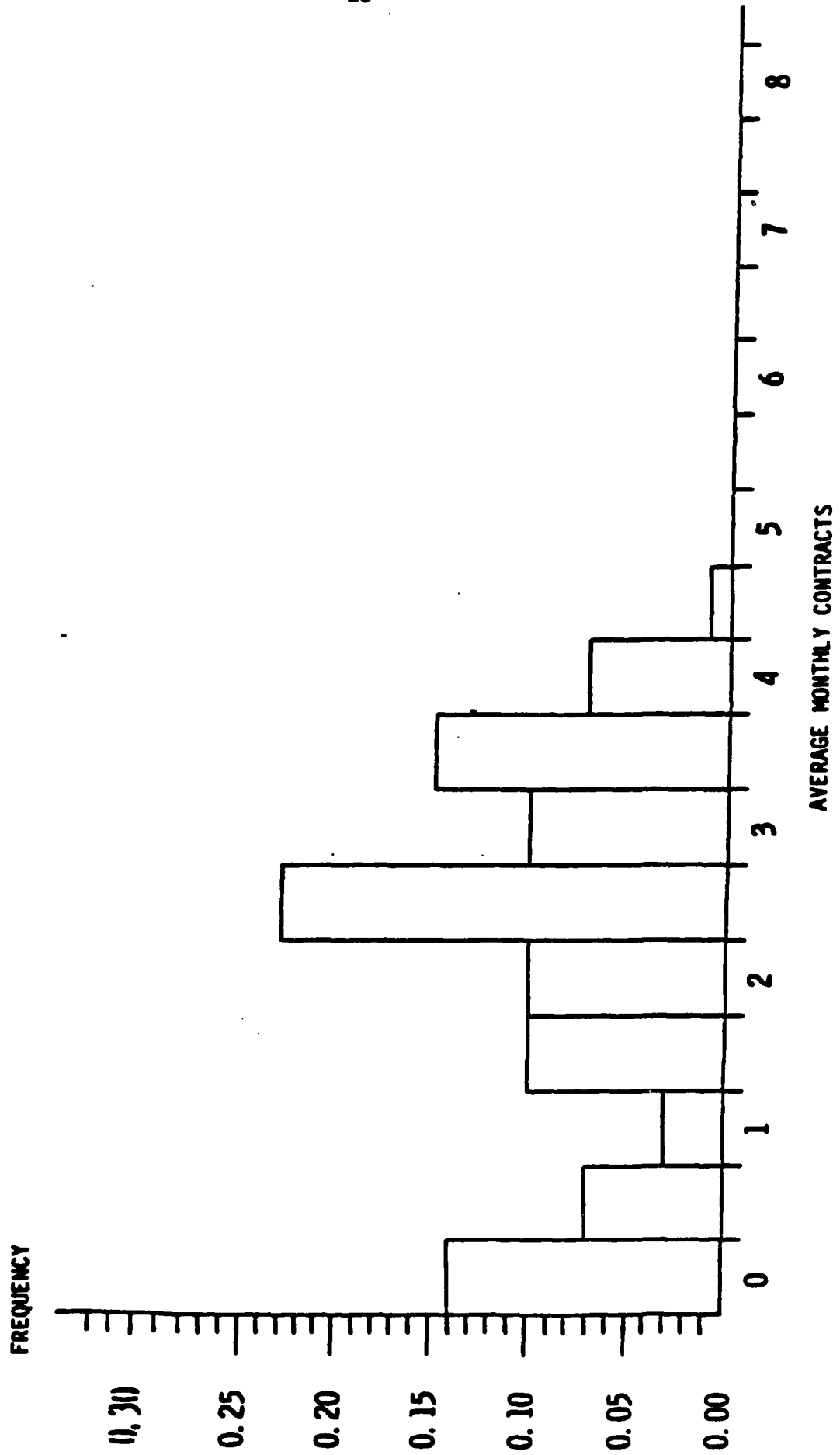
Figure 12

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS PRODUCED
BY RECRUITERS DURING THEIR 25-30 MONTHS OF SERVICE
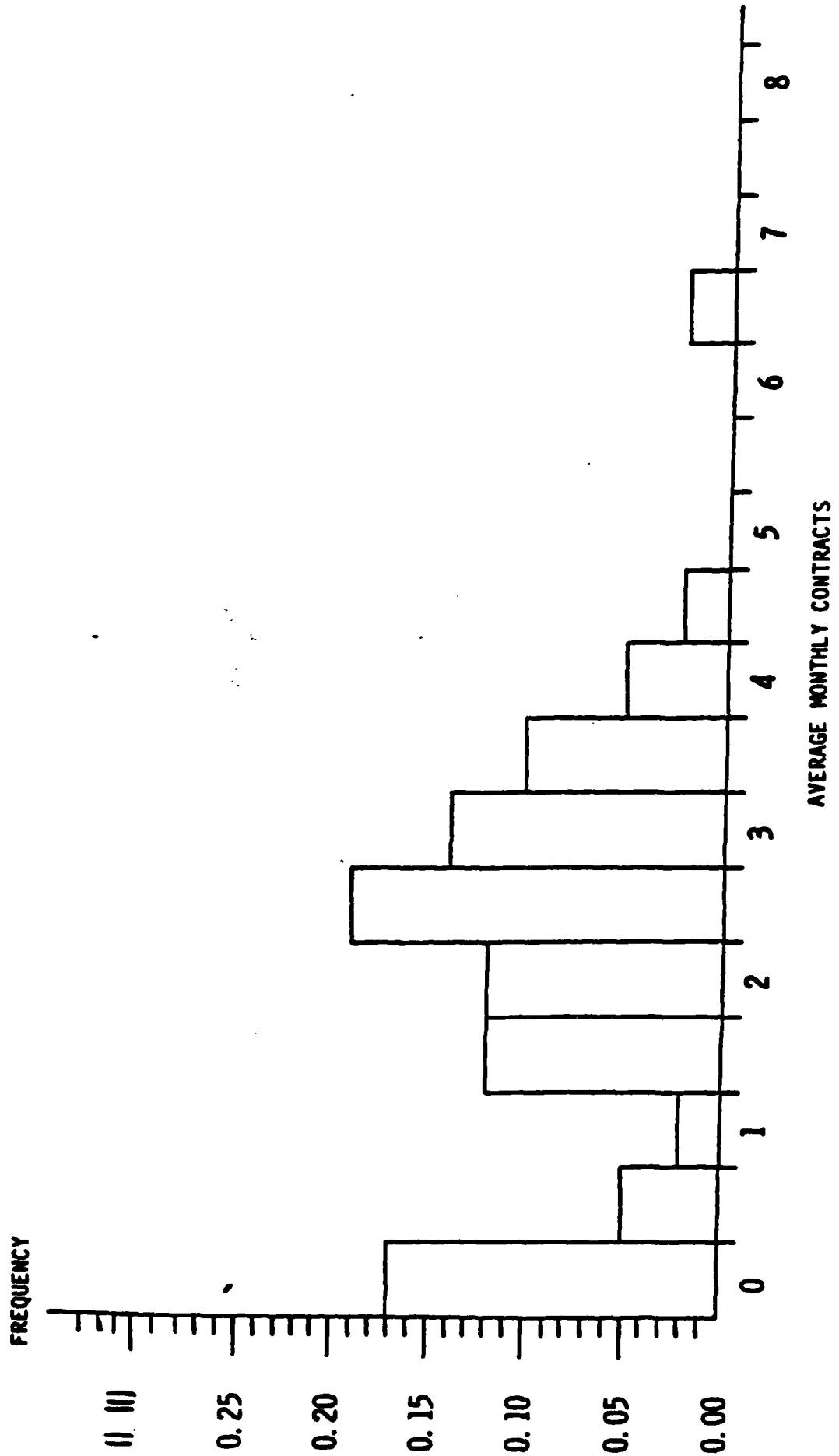
Figure 13

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS PRODUCED
BY RECRUITERS DURING THEIR 31-36 MONTHS OF SERVICE
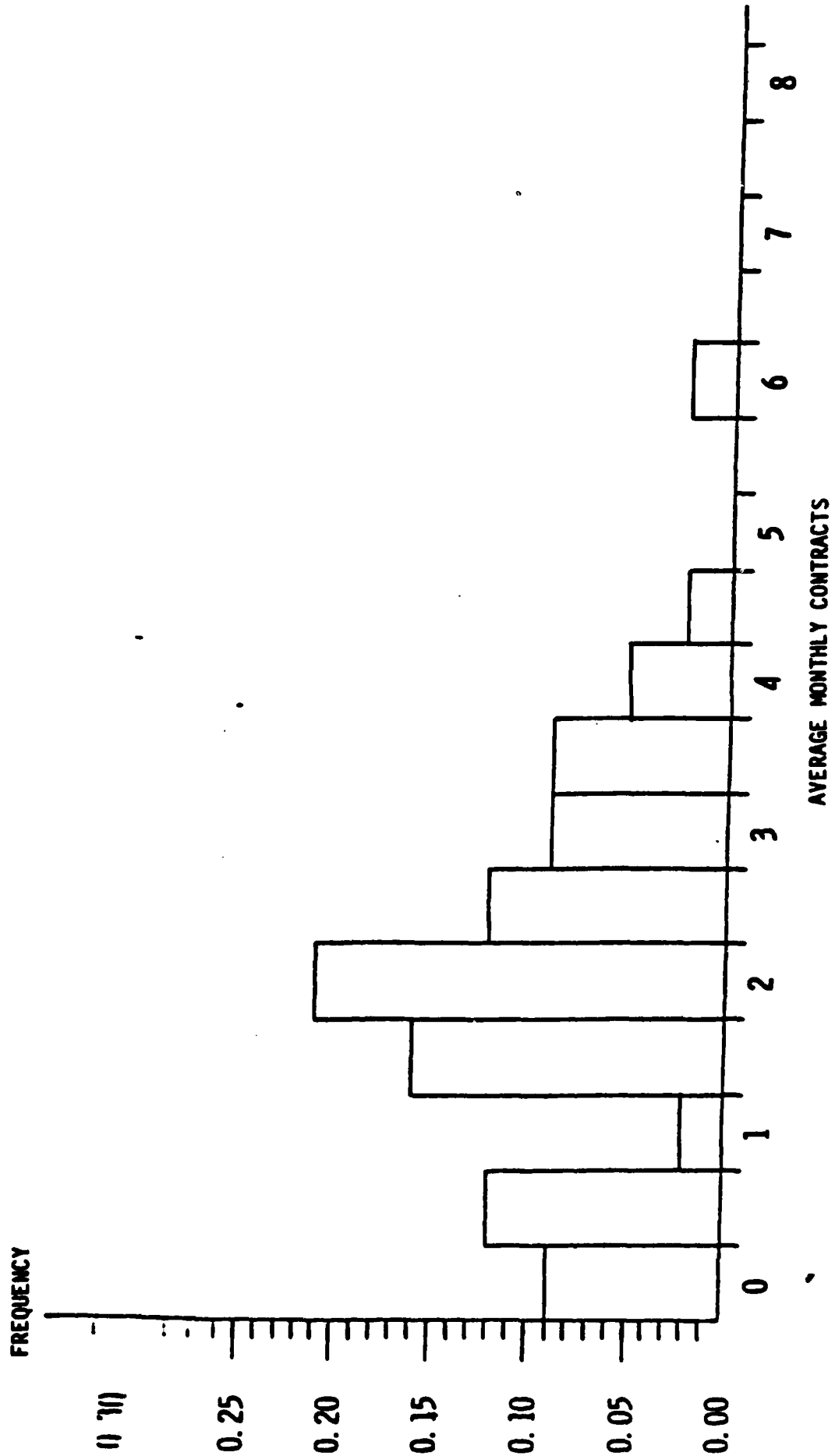
Figure 14

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS PRODUCED
BY RECRUITERS DURING THEIR 37-42 MONTHS OF SERVICE
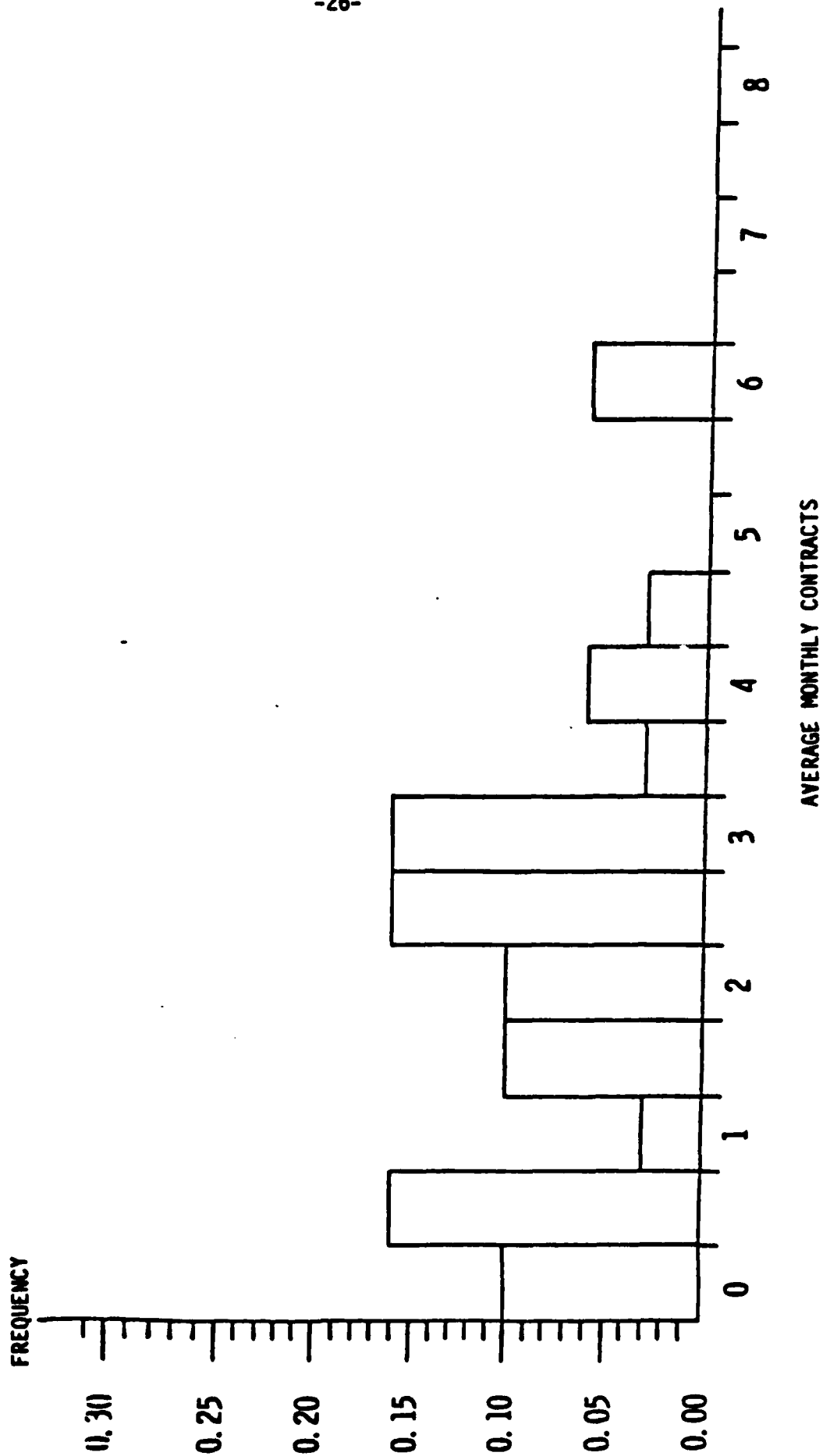
Figure 15

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS PRODUCED
BY RECRUITERS DURING THEIR 43-48 MONTHS OF SERVICE
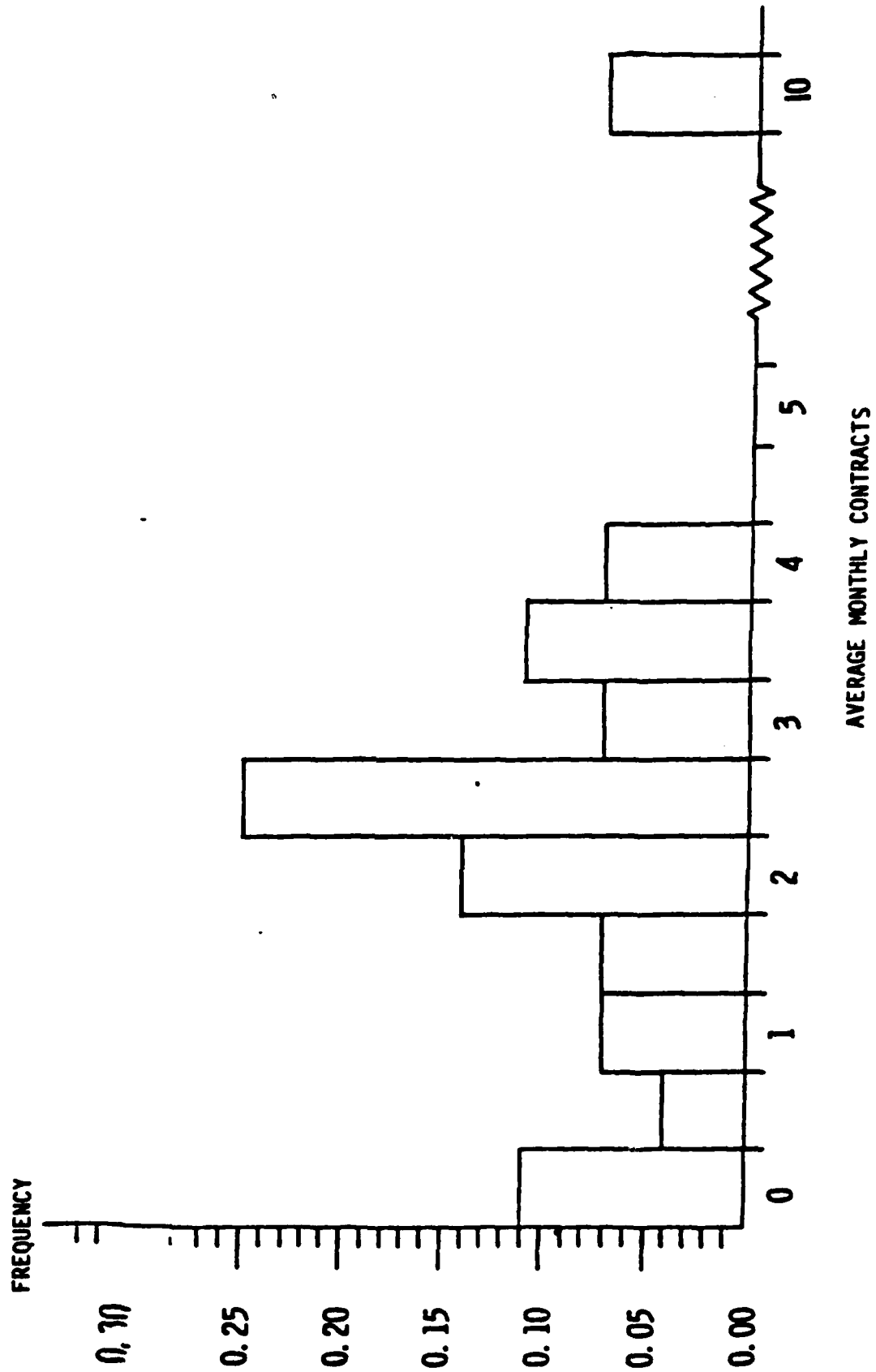
Table 1

DESCRIPTIVE STATISTICS OF THE DISTRIBUTIONS OF RECRUITER
PRODUCTIVITY IN THE 1ST, 2ND, 3RD, AND 4TH YEAR OF SERVICE

Year of Service	Number of Observation	Mean Number of Monthly Contracts	Standard Deviation of the Number of Monthly Contracts
1 1st half 140		1.298	0.844
2nd half 160		1.788	1.162
2	127	1.8898	1.2401
3	70	1.8518	1.21105
4	42	1.9405	1.31815

As can be seen from Table 2, frequency distribution of recruiter productivity in their first half year is not significantly different from the normal distribution, while those of the second six months and the second year are clearly non-normal. Because of the small sample sizes, we were not able to reject the null hypothesis that the distribution is normal for the third and fourth year, despite the bimodal nature observed.

Table 2

SUMMARY OF TESTS OF NORMALITY FOR DISTRIBUTIONS OF
RECRUITER PRODUCTIVITY IN 1ST, 2ND, 3RD, and 4TH YEAR OF SERVICE

Year of Service	Maximum Deviation from Normal Distribution	Critical Value of Test Statistics at 0.1 level	Significance Level of Difference Between the Two Distributions
1 1st half 0.047		0.680	Not Significant
2nd half 0.086		0.636	0 .01
2	0.112	0.072	0.01
3	0.079	0.096	Not Significant
4	0.091	0.124	Not Significant

Thus it appears that there are two classes of recruiters. The performances of the classes are at the two modes observed. In section 7 we will examine whether the classes of recruiters in the various years correspond to the same recruiters.

5.4 The Impact of Goal

Table 3 shows the goal structure of the three NRD's considered. Both Albany and Atlanta follow a progressive goal structure in the initial four months of the recruiter tour, whereas Kansas City follows a monotonic one, allowing only the first month for learning.

Table 3

GOAL STRUCTURE OF ALBANY, ATLANTA, AND KANSAS CITY

Months of Service	1	2	3	4	5 and Beyond
Albany	0	1	2	3	4
Atlanta	1	2	3	4	4
Kansas City	0	4	4	4	4

From Figure 16, which gives the productivity curves of the three NRD's, the "learning" behavior is observed in both Albany and Atlanta in the first four months. In Kansas City, "learning" exists in the first month only and productivity remains stable afterwards. This result suggests that the progressive goal structure may be more efficient than the non-progressive one.

Furthermore, the eventual goal of four per month seems to act as an upper bound during the first two years of service, as observed in the frequency

functions of the last section. Almost no recruiter averages more than two contracts per month in their first two years, and only a few in their third year. Thus, it seems that the potential of the "productive" recruiters are not fully developed until their fourth year, when we observe the outliers in the respective frequency function.

5.5 Regional Differences

Before the analysis, Atlanta was expected to be the most productive NRD of the three observed.

Figure 17 gives the productivity curves of the three NRD's, with the "de-learning" effect eliminated. On average, we find that Albany performs better than the others on the basis of contracts realized per recruiter normalized by experience.

The de-learning curve of the three NRD's is shown in Figure 18. No significant difference is observed in the performance of the last nine months in the three NRD's.

To investigate the differences between the frequency distributions of recruiter productivity in the three NRDs, we examined the frequency distributions of each of the NRDs in the recruiters' first, second, third, and fourth year of service. Table 4 gives some descriptive statistics of these frequency distributions. We notice that, in agreement with what we observed earlier in Figure 17, the performance of recruiters in Albany is consistently better than the others in all the four years. Moreover, the average productivity in both Albany and Kansas City seems to be much more stable than that of Atlanta over the four years of service under consideration.

Figure 16

5 MONTHS LEARNING CURVE IN THE THREE NRD'S
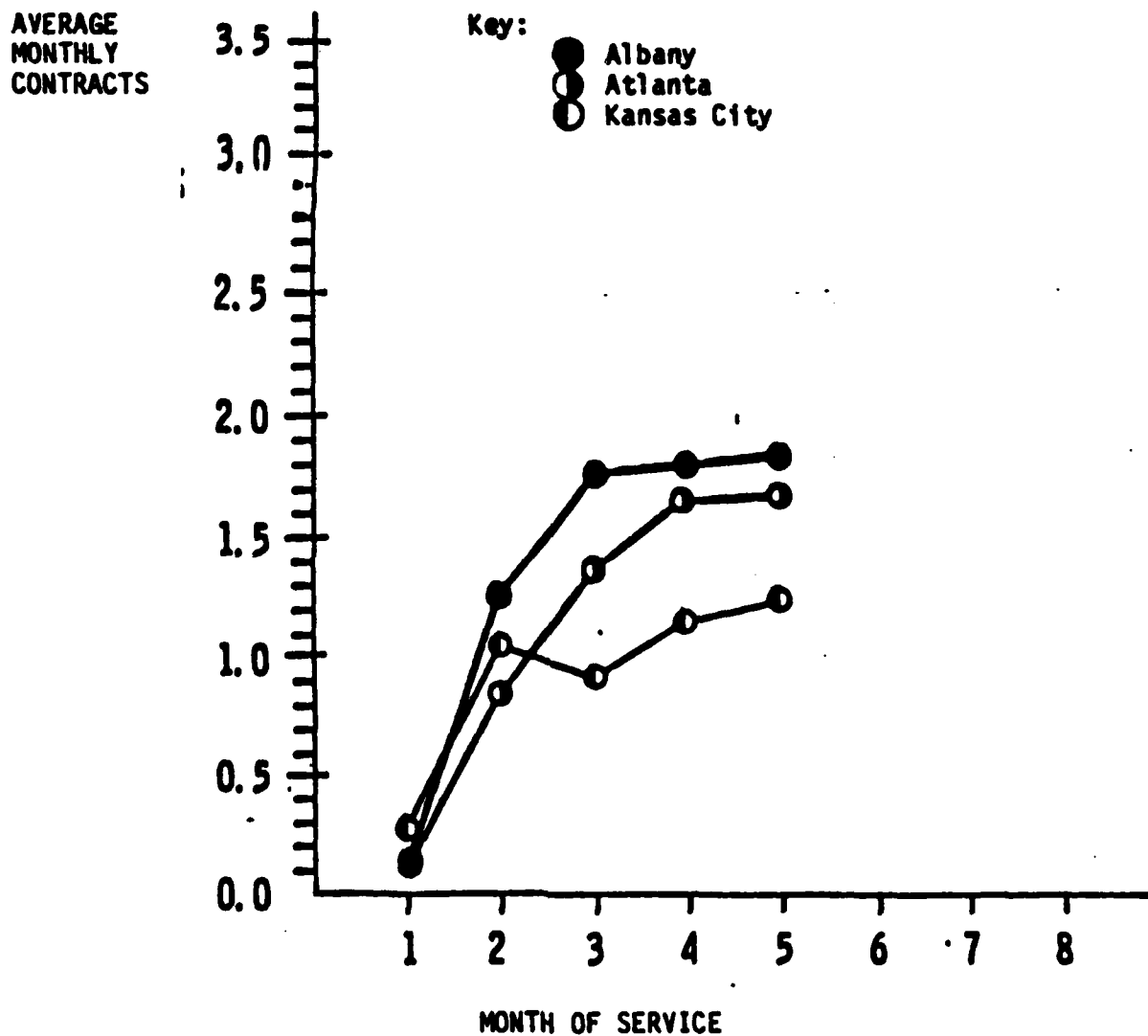
Figure 17

48 MONTHS PRODUCTIVITY CURVE FOR THE THREE NRD'S
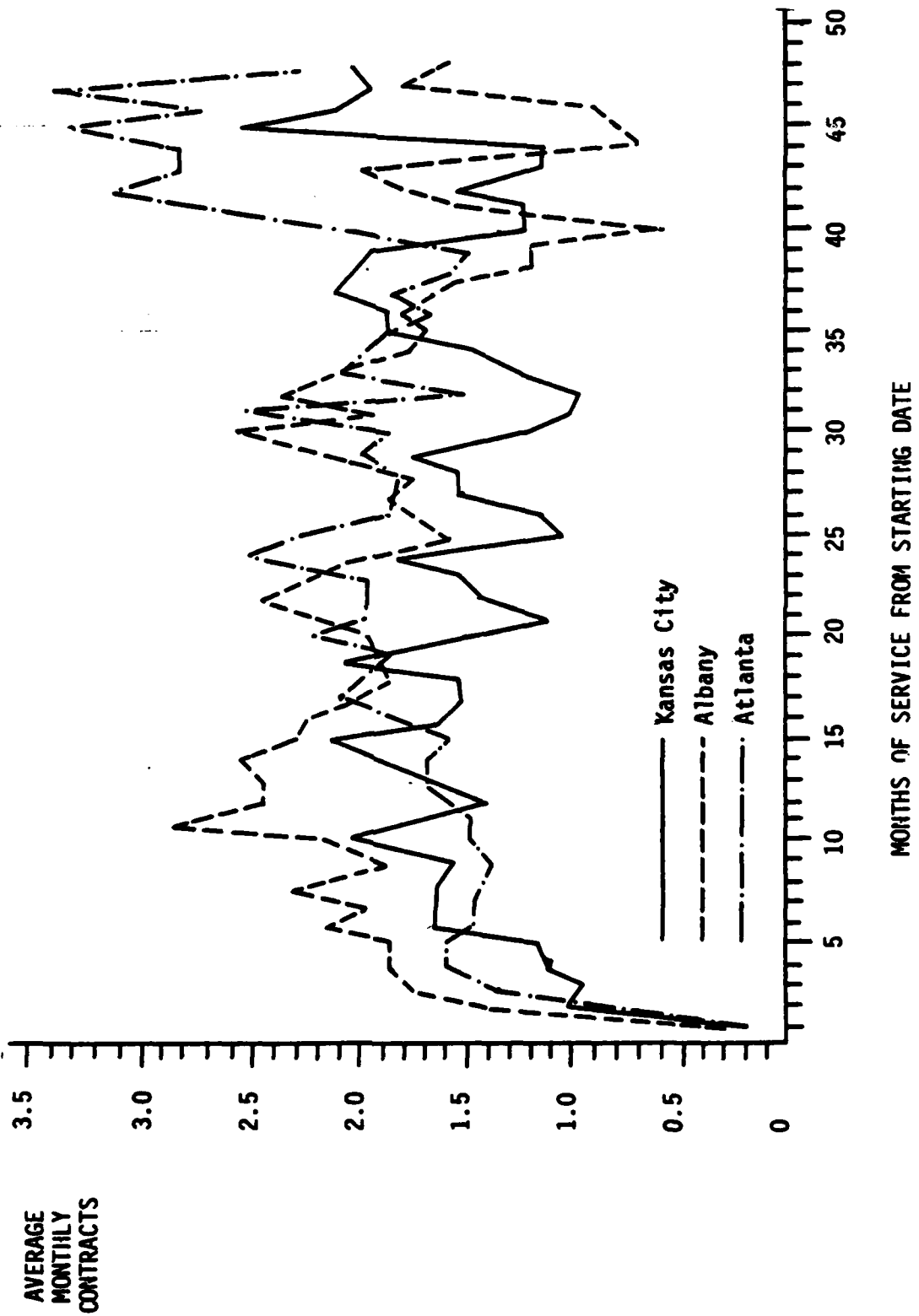
Figure 18

18 MONTHS DE-LEARNING CURVE OF THE THREE NRD'S

Key:
● Albany
◑ Atlanta
○ Kansas City

AVERAGE MONTLY CONTRACTS

NUMBER OF MONTHS PRIOR TO TERMINATION DATE
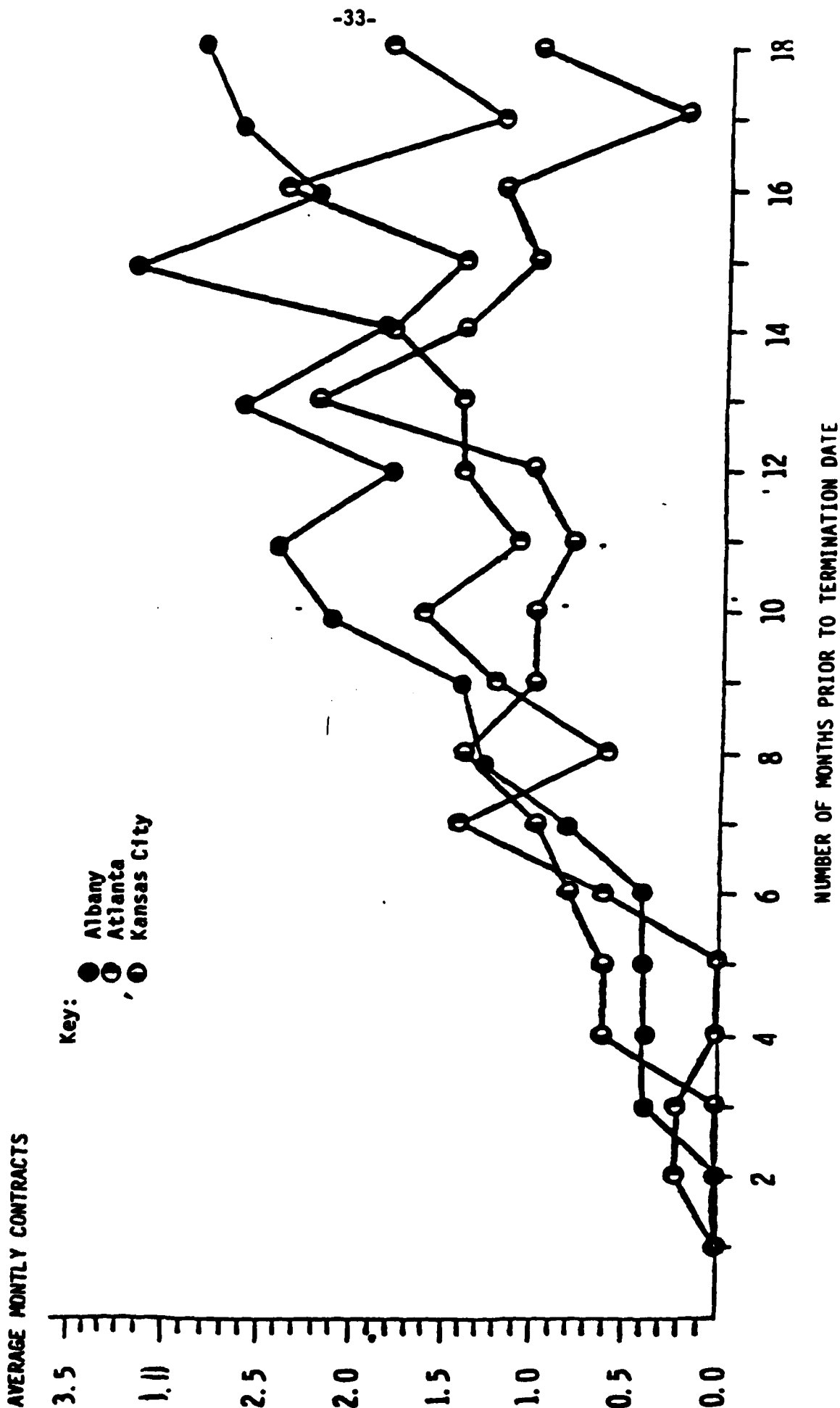
Figures A5.1 to A5.12 (in Appendix) give the frequency functions of recruiter productivity from the 3 NRD's in the recruiters' first, second, third and fourth year of service. In general, we observe that all frequency functions of the 3 NRD's in the second year of the recruiters' tour exhibit the bi-modal nature, although the left-hand mode in the case of Albany is least pronounced (accounting for the generally better performance of Albany in recruiter productivity). The bi-modal nature of the frequency functions is still observed in the third year in Atlanta and Kansas City, whereas the left-hand mode in Albany is almost insignificant. Performance of the recruiters is widely scattered in the fourth year in Atlanta and Kansas City, while Albany is much more uniform.

To test whether the distributions are different between the three NRD's, the Kolmogorov-Smirnov tests were again used. The small sample sizes reduce to a large extent the power of the tests. Nevertheless, it seems that the frequency distributions of recruiter productivity in Atlanta are fairly different from those of Albany and Kansas City, whereas those of Albany and Kansas City are more similar to one another. The results of these analyses are summarized in Table 5; the details of the tests are described in Appendix 4.

In summary, we observe similar learning and delivery phenomena in each Recruiting District. Further, there is little support for the notion that the aggregate frequency functions are radically non-homogenous with respect to the districts. That is, there is little indication that one mode of the observed bimodal-type distributions represent one district while the other mode represents the other two. The non-normal productivity distributions seem more pervasive.

Table 4

DESCRIPTIVE STATISTICS OF DISTRIBUTIONS OF RECRUITER
PRODUCTIVITY IN ALBANY, ATLANTA, AND KANSAS CITY IN
THE 1ST, 2ND, 3RD, AND 4TH YEAR OF SERVICE

		ALBANY	ATLANTA	KANSAS CITY
First Year of Service	No. of Observations	58	61	52
	Mean	1.8664	1.5102	1.6178
	Standard Deviation	1.037	1.1896	0.9426
Second Year of Service	No. of Observations	38	46	43
	Mean	2.0493	1.9806	1.6948
	Standard Deviation	1.1201	1.4135	1.0958
Third Year of Service	No. of Observations	32	24	14
	Mean	1.91016	2.03645	1.4018
	Standard Deviation	1.10496	1.3489	1.0744
Fourth Year of Service	No. of Observations	21	10	11
	Mean	2.2381	1.3875	1.875
	Standard Deviation	1.277	1.2151	1.31426

Table 5

DIFFERENCE BETWEEN DISTRIBUTIONS OF RECRUITER PRODUCTIVITY
IN ALBANY, ATLANTA, AND KANSAS CITY IN
THE 1ST, 2ND, 3RD, AND 4TH YEAR OF SERVICE

		ALBANY VS ATLANTA	ALBANY VS KANSAS CITY	ATLANTA VS KANSAS CITY
First Year	Maximum Deviation Between Distributions	0.204	0.139	0.188
	Significance Level	0.2	---	0.3*
Second Year	Maximum Deviation Between Distributions	0.135	0.173	0.174
	Significance Level	---	---	---
Second Year	Maximum Deviation Between Distributions	0.156	0.228	0.321
	Significance Level	---	---	0.3*
Second Year	Maximum Deviation Between Distributions	0.357	0.255	0.227
	Significance Level	---	---	---

*Approximately

5.6 Impact of Forced Extensions

In 1977, recruiters that were scheduled to terminate their recruiting service were involuntarily extended until the end of the fiscal year. It should be noted that eleven forced-extension cases are observed. Most of these recruiters had served for more than three years. Therfore, we compared their de-learning behavior with other recruiters who had served for more than three years under the normal circumstances. Figure 19 shows the comparison. Even though these recruiters are the higher than average per- formers (as shown in their productions between the last four to seven months), the de-learning effect is still very significant so that their last three months production is again close to zero.

5.7 Forecasting Recruiter Performance - Transitional Probabilities

Table 6 below shows the transitional probabilities of the performance of recruiters from their first to second year of service. It is based on 76 observations.

Table 6

S E C O N D   Y E A R

Proportion / Average No. of Contracts Per Month	1 or Below	Greater than 1 but not Ex-ceeding 3	Greater than 3
1 or Below	0.78	0.17	0.05
Greater than 1 but not Exceeding 3	0.16	0.64	0.2
Greater than 3	0	0.75	0.25

F I R S T   Y E A R

Figure 19

7 MONTHS DE-LEARNING CURVE OF RECRUITERS TERMINATING
IN NOVEMBER 1977

Key: ● Recruiters terminating Nov. 1977
      ○ Recruiters serving more than 3 years

AVERAGE
MONTHLY
CONTRACTS

NUMBER OF MONTHS PRIOR TO TERMINATION DATE
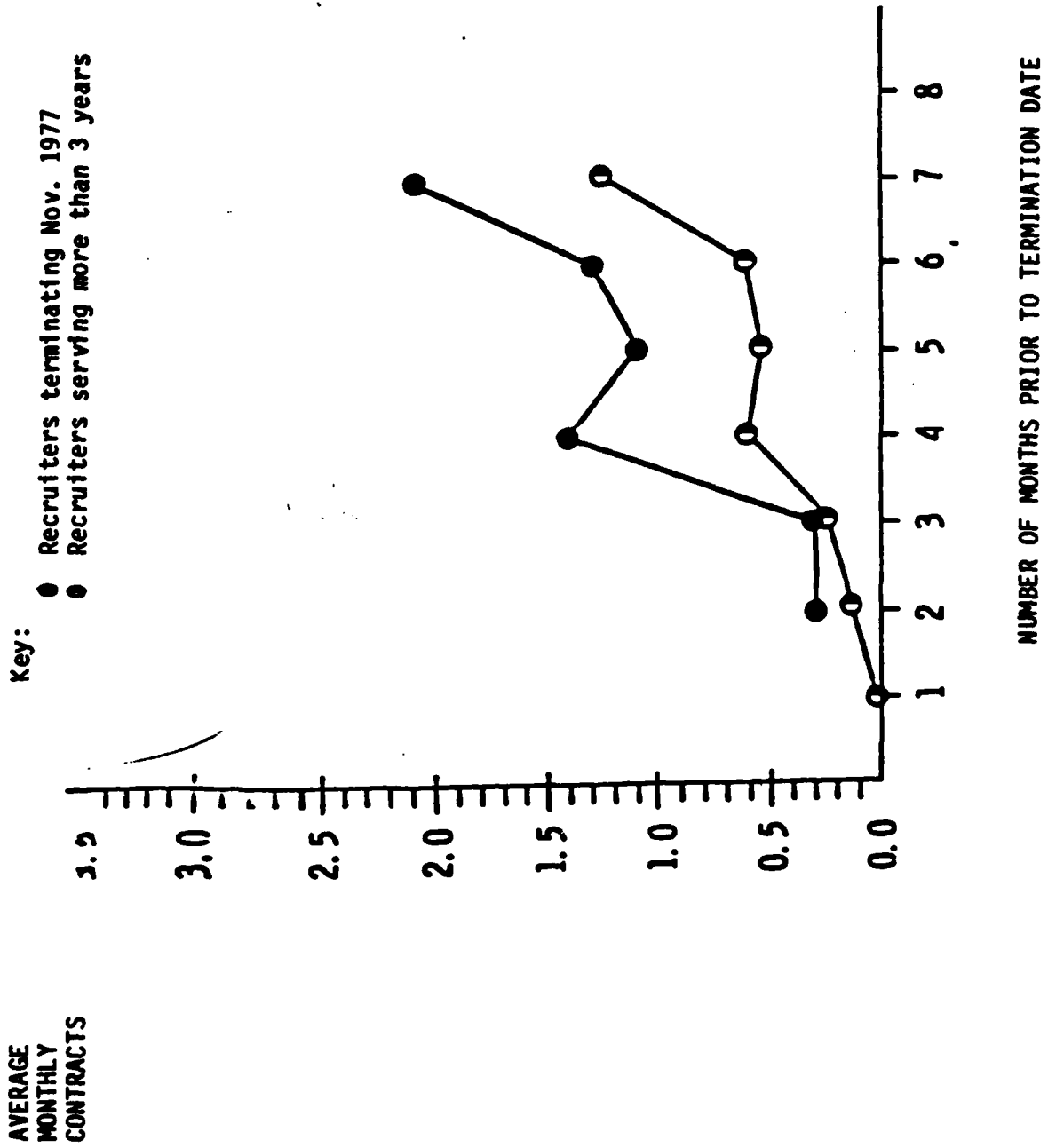
We see that the performance of most of the recruiters with an average of less than three monthly contracts in their first year is very stable as they enter their second year of service. That is to say, the probability of recruiters in the low performance category during their first year remaining in the low performance category in their second year is very high.

On the other hand, 3/4 of those recruiters who do exceptionally well in their first year (more than three per month) drop their production to the average level in the second year (one to three per month). We note that while the second and the third rows are heavily loaded in the middle column, the first row is not, suggesting that the observed probabilities are not simply results of regression towards the mean.

Table 7 shows the same transitional probabilities from the second to the third year, and the same pattern is observed. Data in Table 3 is based on 33 observations.

<u>Table 7</u>

THIRD YEAR

Proportion / Average No. of Contracts Per month // Average No. of Contracts Per Month		1 or Below	Greater than 1 but not Exceeding 3	Greater than 3
SECOND YEAR	1 or Below	1	0	0
	Greater than 1 but not Exceeding 3	0.2	0.6	0.2
	Greater than 3	0.1	0.6	0.3

6. <u>Conclusion</u>

The original motivation for this investigation was to provide guidance for the execution of a large scale field experiment in which the number of recruiters in selected markets was to be systematically varied. The analyses described in this report led to a recognition that recruiter experience levels were important determinants of productivity. As a result, each market involved in the field intervention phase of our work provided data on the number of recruiters in that market <u>and</u> data composed of each recruiter's starting date and scheduled or actual termination date. This data on recruiter experience levels has been used as a co-variate in analyzing recruiter level effects on enlisted contracts (see Volume II of this report series).

Significant opportunities for further research in the area of recruiter or salesforce productivity exists. Among these opportunities are:

- an in-depth analysis of the effect of the de nova recruiter incentive plan on recruiter productivity

- a detailed investigation of the factors affecting the distribution of recruiter productivity especially with respect to the bi-modal nature of these distributions.

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APPENDICES

APPENDIX 1

Table A1.1

**PERCENTAGE OF NAVY CONTRACTS WITH PRIOR SERVICE IN 50 ADIs
FROM OCTOBER 1975 TO SEPTEMBER 1978**

	No. of Observations	Percentage
> 10%	3	6%
9 - 10%	5	10
8 - 9%	9	18
7 - 8%	6	12
6 - 7%	8	16
5 - 6%	10	20
4 - 5%	8	16
3 - 4%	1	2
Total	50	100%

Mean = 6.99%

Table A1.2

SEASONAL INDICES USED TO DESEASONALIZE CONTRACT DATA

Month	Index
January	104.5
February	95.5
March	98.5
April	79.7
May	73.5
June	106.5
.July	111.3
August	120.6
September	113.7
October	108.3
November	94.9
December	92.9

APPENDIX 2

Detailed Description of Figures 1 to 19

Table A2.1

AVERAGE NUMBER OF CONTRACTS PER MONTH PER RECRUITER
(Figure 1)

Duration from Starting Date of Recruiter Duty	Number of Observations	Mean Number of Monthly Contracts	Standard Deviation
1 month	142	0.197	0.449
2 to 3 months	157	1.229	1.173
3 to 6 months	152	1.651	1.208
7 to 12 months	143	1.723	1.246
13 to 14 months	52	2.029	1.172
25 to 36 months	35	1.917	1.075
37 months and beyond	49	1.328	1.121

Table A2.2

18 MONTH DE-LEARNING CURVE
(Figure 2)

Number of Months Prior to Termination Date	Number of Observations	Average Monthly Contracts	Standard Deviation
1	89	0.03966885958	0.1840479713
2	88	0.08428428664	0.3027638239
3	88	0.2409638267	0.56305892
4	88	0.5757558154	1.084594184
5	77	0.5236917502	0.9356784385
6	74	0.5645909777	0.9412325225
7	71	1.021910674	1.357591096
8	59	1.18829167	1.560816762
9	51	1.183324453	1.473107569
10	49	1.57462134	1.711392112
11	34	1.470151648	1.556123252
12	30	1.435522727	1.906761875
13	30	2.058931434	1.807676137
14	29	1.665423835	1.225269169
15	28	1.883323957	1.637020876
16	16	1.857685429	2.100274622
17	16	1.427319533	1.590856976
18	14	1.940897083	2.210812672

Table A2.3

48 MONTHS PRODUCTIVITY CURVE OF RECRUITERS WITH
DE-LEARNING EFFECT ELIMINATED
(Figure 3)

Month of Service from Starting Date	Number of Observations	Average Monthly Contracts	Standard Deviation
1	142	0.195056018	0.4415340553
2	156	1.062657099	1.368181589
3	164	1.394799439	1.546405104
4	166	1.572970884	1.404383025
5	168	1.590596287	1.481771606
6	166	1.760302214	1.678509325
7	171	1.69009733	1.712722438
8	171	1.885048677	1.833181669
9	174	1.571739969	1.61592693
10	173	1.780176129	1.832415575
11	160	2.102114905	2.085671668
12	159	1.76155097	1.74775472
13	154	1.929933596	2.085275666
14	146	2.031198066	2.091512813
15	140	1.991253683	1.877276346
16	131	1.829466453	1.891198587
17	130	1.879473193	2.076010911
18	125	1.802751061	1.889249901
19	121	2.011269704	1.919739815
20	114	1.868422881	1.891119616
21	104	1.69999884	1.76243194
22	99	1.969415959	2.001833931
23	93	1.921484838	1.862165318
24	91	2.090863596	2.255512611
25	88	1.671117549	2.024141397
26	83	1.707956259	1.936264613
27	88	1.685060314	1.684251182
28	80	1.691622148	1.746908728
29	78	2.00236285	2.235868966
30	70	2.07354282	2.895086406
31	66	1.959821455	2.480562075
32	64	1.755942161	1.685675003
33	68	1.871553559	1.792189692
34	66	1.776755697	1.628496866
35	70	1.809339711	2.012972467
36	65	1.743679073	1.83907898
37	62	1.830958732	2.252762687
38	52	1.584263695	1.972820724
39	54	1.505158944	1.492998499
40	51	1.34477563	1.874001543
41	49	1.935623316	2.32248433
42	42	2.404413863	2.479247164
43	42	2.229530817	2.51134927
44	40	1.914925592	3.272199107
45	36	2.560565923	3.63929373
46	35	2.131405642	3.338814338
47	38	2.629314404	3.89583602
48	38	2.021750972	1.81894874

Table A2.4

FREQUENCY FUNCTION OF RECRUITER PRODUCTIVITY IN THEIR
FIRST YEAR OF SERVICE
(Figure 4)

Average Monthly Contracts	Frequency
0	0.053
0.5	0.129
1	0.117
1.5	0.146
2	0.187
2.5	0.158
3	0.111
3.5	0.047
4	0.024
4.5	0.012
5	0.012
5.5	0.000
6	0.006

Table A2.5

FREQUENCY FUNCTION OF RECRUITER PRODUCTIVITY IN THEIR SECOND YEAR OF SERVICE
(Figure 5)

Average Monthly Contracts	Frequency
0	0.071
0.5	0.165
1	0.032
1.5	0.102
2	0.078
2.5	0.189
3	0.166
3.5	0.126
4	0.047
4.5	0.008
5	0
5.5	0.016

Table A2.6

FREQUENCY FUNCTION OF RECRUITER PRODUCTIVITY IN THEIR
THIRD YEAR OF SERVICE
(Figure 6)

Average Monthly Contracts	Frequency
0	0.129
0.5	0.072
1	0.072
1.5	0.086
2	0.172
2.5	0.157
3	0.186
3.5	0.043
4	0.043
4.5	0.029
7.5	0.014

Table A2.7

FREQUENCY FUNCTION OF RECRUITER PRODUCTIVITY IN THEIR
FOURTH YEAR OF SERVICE
(Figure 7)

Average Monthly Contracts	Frequency
0	0.048
0.5	0.143
1	0.071
1.5	0.095
2	0.143
2.5	0.191
3	0.048
3.5	0.143
4	0.048
4.5	0
5	0.024
5.5	0.
6	0.024
6.5	0
7	0
7.5	0.024

Table A2.8

**FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
PRODUCED BY RECRUITERS IN THEIR 1-6 MONTHS OF SERVICE
(Figure 8)**

Average Monthly Contracts	Frequency
0	0.06504065041
0.5	0.1382113821
1	0.1463414634
1.5	0.2926829268
2	0.1707317073
2.5	0.1056910569
3	0.0406504065
3.5	0.0243902439
4	0.0162601626
4.5 and beyond	0

Table A2.9

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
PRODUCED BY RECRUITERS IN THEIR 7-12 MONTHS OF SERVICE
(Figure 9)

Average Monthly Contracts	Frequency
0	0.1287878788
0.5	0.0909C909091
1	0.06818181818
1.5	0.1863636364
2	0.09848484848
2.5	0.196969697
3	0.1363636364
3.5	0.06060606061
4	0.04545454545
4.5	0.007575757576
5	0.02272727273
5.5	0
6	0.007575757576
6.5 and beyond	0

Table A2.10

**FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
PRODUCED BY RECRUITERS IN THEIR 13-18 MONTHS OF SERVICE
(Figure 10)**

Average Monthly Contracts	Frequency
0	0.1214953271
0.5	0.09345794393
1	0.08411214953
1.5	0.05607476636
2	0.1962616822
2.5	0.09345794393
3	0.08411214953
3.5	0.1682242991
4	0.06542056075
4.5	0.009345794393
5	0.02803738318
5.5 and beyond	0

Table A2.11

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
PRODUCED BY RECRUITERS IN THEIR 19-24 MONTHS OF SERVICE
(Figure 11)

Average Monthly Contracts	Frequency
0	0.1408450704
0.5	0.07042253521
1	0.02816901408
1.5	0.0985915493
2	0.0985915493
2.5	0.2253521127
3	0.0985915493
3.5	0.1549295775
4	0.07042253521
4.5	0.01408450704
5 and beyond	0

Table A2.12

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
PRODUCED BY RECRUITERS IN THEIR 25-30 MONTHS OF SERVICE
(Figure 12)

Average Monthly Contracts	Frequency
0	0.1724137931
0.5	0.05172413793
1	0.01724137931
1.5	0.1206896552
2	0.1206896552
2.5	0.1896551724
3	0.1379310345
3.5	0.1034482759
4	0.05172413793
4.5	0.01724137931
5	0
5.5	0
6	0
6.5	0.01724137931
7 and beyond	0

Table A2.13

**FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
PRODUCED BY RECRUITERS IN THEIR 31-36 MONTHS OF SERVICE
(Figure 13)**

Average Monthly Contracts	Frequency
0	0.09302325581
0.5	0.1162790698
1	0.02325581395
1.5	0.1627906977
2	0.2093023256
2.5	0.1162790698
3	0.09302325581
3.5	0.09302325581
4	0.04651162791
4.5	0.02325581395
5	0
5.5	0
6	0.02325581395
6.5 and beyond	0

Table A2.14

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
PRODUCED BY RECRUITERS IN THEIR 37-42 MONTHS OF SERVICE
(Figure 14)

Average Monthly Contracts	Frequency
0	0.09677419355
0.5	0.1612903226
1	0.03225806452
1.5	0.09677419355
2	0.09677419355
2.5	0.1612903226
3	0.1612903226
3.5	0.03225806452
4	0.06451612903
4.5	0.03225806452
5	0
5.5	0
6	0.06451612903
6.5 and beyond	0

Table A2.15

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
PRODUCED BY RECRUITERS IN THEIR 42-48 MONTHS OF SERVICE
(Figure 15)

Average Monthly Contracts	Frequency
0	0.1071428571
0.5	0.03571428571
1	0.07142857143
1.5	0.07142857143
2	0.1428571429
2.5	0.25
3	0.07142857143
3.5	0.1071428571
4	0.07142857143
4.5	0
5	0
5.5	0
6	0
6.5	0
7	0
7.5	0
8	0
8.5	0
9	0
9.5	0
10 and beyond	0.07142857143

Table A2.16.1

48 MONTHS PRODUCTIVITY CURVE FOR THE THREE NRD'S
(Figure 17)

Months of Service From Starting Date	Average Monthly Contracts		
	Albany	Atlanta	Kansas City
1	0.1603949806	0.1748894622	0.2879764609
2	1.287548711	0.83904198	1.084280795
3	1.735737683	1.361620873	0.9567226892
4	1.770640177	1.643159142	1.183632643
5	1.817613291	1.626529578	1.237600343
6	2.061109849	1.549263611	1.658351904
7	1.905461096	1.479392954	1.709027527
8	2.28358513	1.709012472	1.692199154
9	1.775581433	1.352736928	1.608772815
10	2.063944671	1.451785278	1.864788148
11	2.799198581	1.5261216	2.06754263
12	2.361700954	1.489199925	1.515086593
13	2.410699306	1.682610371	1.769321421
14	2.501072151	1.706847109	1.955033868
15	2.298441609	1.59132296	2.159576438
16	2.204212513	1.669509104	1.693394543
17	1.953846209	2.117142643	1.576815244
18	1.810309415	2.016580439	1.561898431
19	2.093551122	1.8653849	2.084668495
20	1.906582545	2.201907609	1.514858722
21	1.971540924	2.04206565	1.170839787
22	2.352083278	2.035417274	1.532061837
23	2.192520567	1.964485567	1.565142474
24	1.980157952	2.483426762	1.85898401
25	1.540650957	2.364736302	1.14179006
26	1.867300013	1.886559034	1.242503417
27	1.798482848	1.565501253	1.630655407
28	1.679864989	1.782271875	1.589887243
29	2.088627362	2.013599862	1.785318336
30	2.488735285	1.924139009	1.295415134
31	1.922183634	2.494318212	1.057019505
32	2.327276168	1.485706951	1.003485053
33	2.00580788	2.081843203	1.27046275
34	1.892165693	1.776317135	1.511200857
35	1.869979184	1.655479222	1.899618936
36	1.64925081	1.799822444	1.87775399
37	1.790872926	1.572613922	2.217834644
38	1.492187958	1.193746162	2.111308077
39	1.393975026	1.16984667	2.046955636
40	1.860437501	0.6195858923	1.26920817
41	2.500640006	1.529501049	1.267397672
42	3.087348545	1.803714299	1.646719981
43	2.849128616	2.012657305	1.243820031
44	2.834632452	0.7474664233	1.197925167
45	3.312856667	0.803499279	2.612095898
46	2.674583392	0.8809559904	2.156560941
47	3.405760178	1.836435281	2.007486054
48	2.184999285	1.586354101	2.056428881

Table A2.16.2

NUMBER OF OBSERVATIONS IN THE 48 MONTHS PRODUCTIVITY CURVE

# of Months from Starting Date	Albany	Atlanta	Kansas City
1	52	58	32
2	57	61	38
3	60	62	42
4	60	64	42
5	60	63	45
6	58	59	49
7	56	62	53
8	54	62	55
9	55	61	58
10	53	61	59
11	49	56	55
12	48	56	55
13	46	55	53
14	44	52	50
15	39	51	50
16	37	45	49
17	37	47	46
18	37	46	42
19	37	42	42
20	38	37	39
21	35	31	38
22	35	29	35
23	35	28	30
24	35	27	29
25	34	27	27
26	34	27	22
27	37	26	20
28	37	25	18
29	37	25	16
30	33	24	13
31	29	24	13
32	28	23	13
33	28	25	15
34	30	23	13
35	32	22	16
36	32	18	15
37	32	16	14
38	25	13	14
39	26	14	14
40	23	15	13
41	24	12	13
42	21	10	11
43	21	10	11
44	20	9	11
45	18	8	10
46	18	8	9
47	18	9	11
48	19	8	11

Table A2.17.1

18 MONTHS DE-LEARNING CURVE OF THE THREE NRD'S
(Figure 18)

Number of Months Prior to Termination Date	Average Monthly Contracts		
	Albany	Atlanta	Kansas City
1	0.0606318016	0	0.03693444137
2	0.06384173639	0.1805864326	0.03664614483
3	0.3259905044	0.2608823897	0.07119561967
4	0.5709451547	0.6478349107	0.5213057074
5	0.4449177728	0.6683561803	0.5378134511
6	0.3760652249	0.6500846125	0.7859996218
7	0.8326664539	1.361603304	1.019117708
8	1.350648966	0.6609738428	1.318369815
9	1.397574346	1.100044574	1.005415595
10	2.100769992	1.57020653	0.9899488768
11	2.301480082	1.170188569	0.863210982
12	1.883582406	1.499061303	0.9762096376
13	2.503261779	1.303324515	2.273218601
14	1.896015952	1.838294499	1.335317923
15	3.217459379	1.459821076	1.063754669
16	2.106165757	2.395926924	1.298670964
17	2.531528537	1.251956182	0.2267573696
18	2.784963751	1.814058957	1.004119958

Table A2.17.2

NUMBER OF OBSERVATIONS IN THE 18 MONTHS DE-LEARNING CURVE

# of Months prior to termination date	Albany	Atlanta	Kansas City
1	43	21	25
2	43	21	24
3	43	21	24
4	43	21	24
5	37	18	22
6	34	18	22
7	32	18	21
8	27	13	19
9	20	13	18
10	19	13	17
11	12	11	11
12	10	9	11
13	10	9	11
14	9	9	11
15	9	9	10
16	7	3	6
17	7	3	6
18	6	3	5

Table A2.30

7 MONTHS DE-LEARNING CURVE OF THOSE RECRUITERS TERMINATING IN NOVEMBER 1977 (Figure 31)

Number of Months Prior to Termination date	Number of Observations	Average Monthly Contracts	Standard Deviation
1	11	0	0
2	11	0.2518	0.5971
3	11	0.3198	0.4437
4	11	1.4322	1.3920
5	11	1.1435	1.1429
6	11	1.2804	1.2787
7	11	2.1027	1.8619

APPENDIX 3

Tests of Normality of Distribution of Recruiter Productivity

Let $F_i(x)$ denotes the observed cumulative distribution of recruiter productivity in the ith year; i = 1st half, 2nd half of 1st year, 2, 3 or 4; and let $F_i^*(x)$ denotes the respective normal distribution so that the mean and standard deviation of $F_i^*(x)$ correspond to those of $F_i(x)$. Figures A3.1, A3.2, A3.3 and A3.4 graph the cumulative distributions $F_i(x)$ and $F_i^*(x)$ for $i=1$, 2, 3, and 4 respectively.

We want to test

$$H_0: F_i(x) = F_i^*(x)$$

against

$$H_1: F_i(x) \neq F_i^*(x)$$

We'll use the Kolmogorov-Smirnov goodness of fit test for the following reasons:

(i) in certain cases, we do not have sufficiently large samples in deriving our frequency functions; in these cases the Kolmogorov-Smirnov test is still exact whereas the other tests will rely on appoximations when the sample size is small.

(ii) while the chi-square test is specifically designed for use with categorical data, Kolmogorov-Smirnov statistics are for random samples from continuous populations.

(iii) normal tests are powerless to detect differences from hypothesized variance.

We then form

$$D_i(x) = |F_i(x) - F_i^*(x)|$$

Figure A3.1

CUMULATIVE DISTRIBUTION OF FIRST 6-MONTH RECRUITER PRODUCTIVITY
F_1 AND NORMAL DISTRIBUTION F_1^* WITH MEAN 1.298 AND STANDARD DEVIATION 0.844


```
1.00I                                      *
    I
    I
    I
    I                                   *
0.75I                              *
    I
    I                        *
    I
0.50I              + *
    I
    I        *
    I
0.25I
    I   + *
    I
    I
    *
0.00I   I   I   I   I   I   I   I   I   I   I   I
    0       1       2       3       4       5       6
```

Average Monthly
Contracts
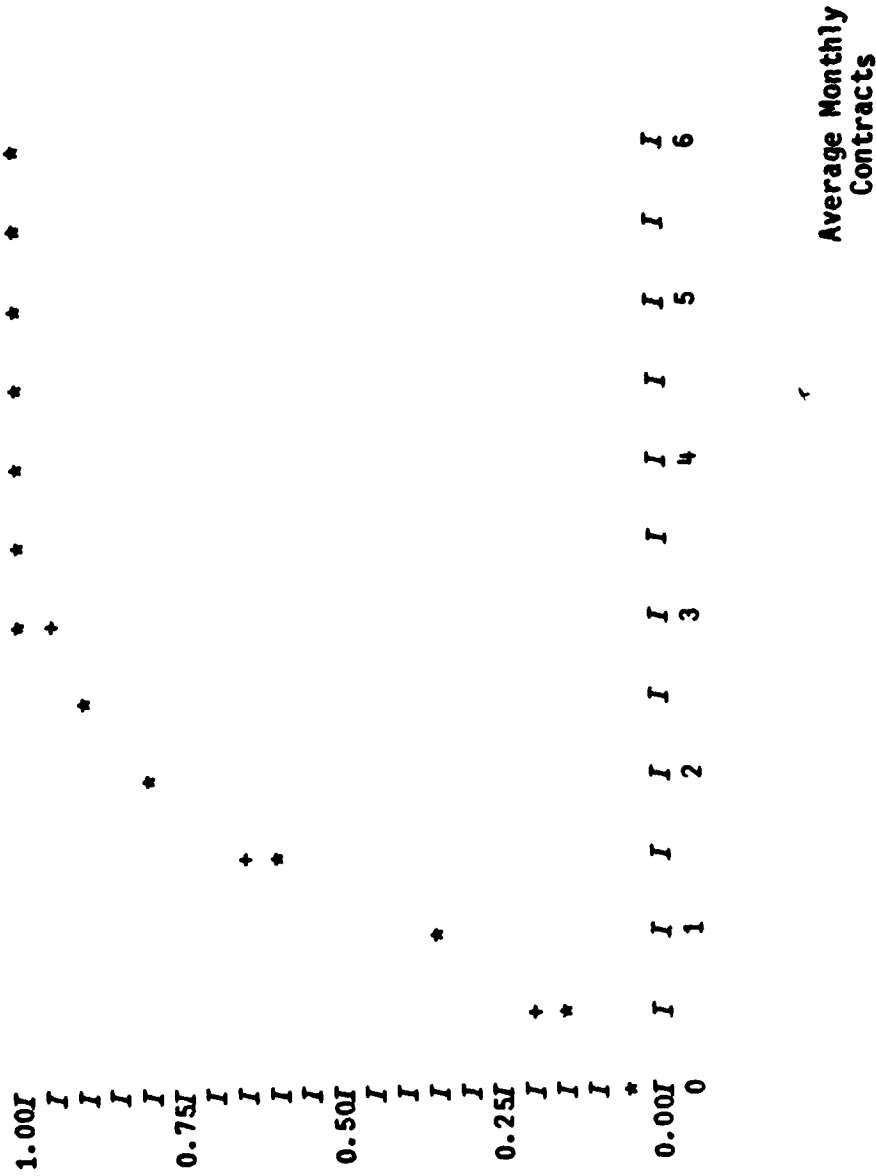
Key: F_1 = +
      F_1^* = *

Figure A3.2

CUMULATIVE DISTRIBUTION OF SECOND 6-MONTH RECRUITER PRODUCTIVITY
F_1 AND NORMAL DISTRIBUTION F_1^* WITH MEAN 0.1788 AND STANDARD DEVIATION 1.162
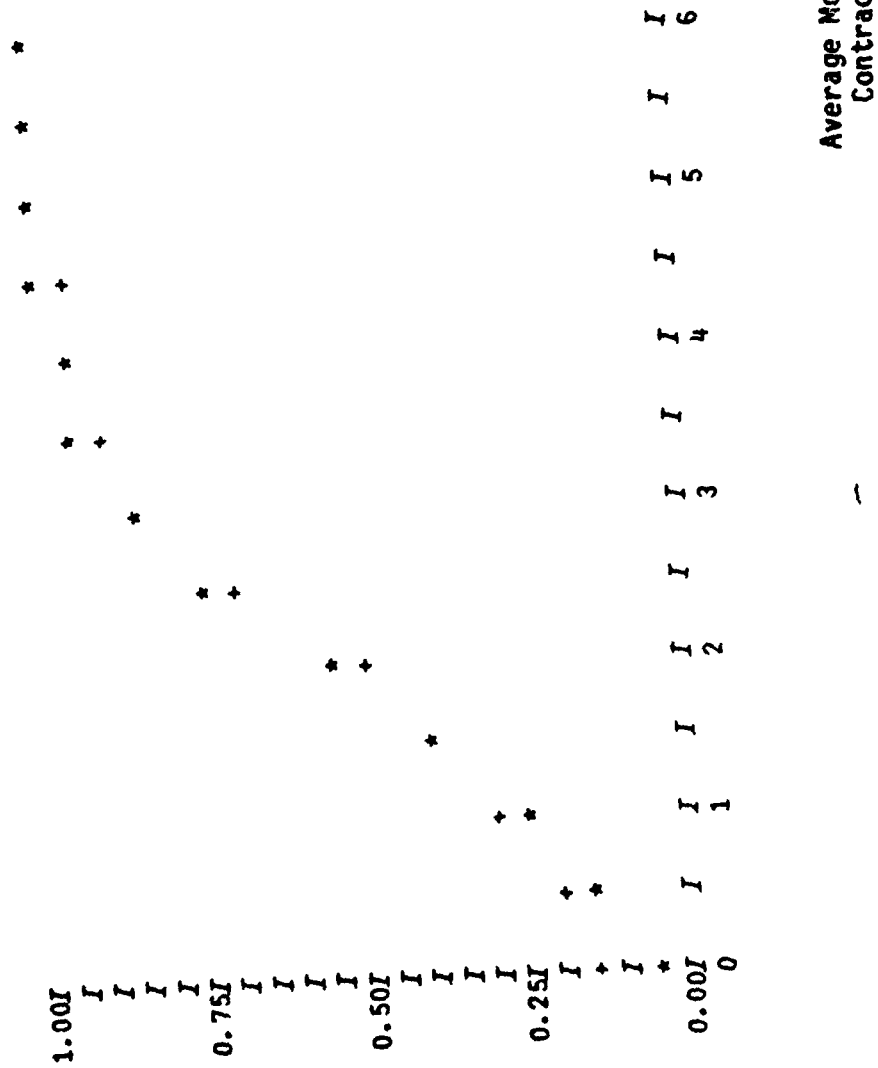
Key: F_1 = +
F_1^* = *

Figure A3.3

CUMULATIVE DISTRIBUTIONS OF SECOND YEAR RECRUITER PRODUCTIVITY
F₂ AND NORMAL DISTRIBUTION F₂* WITH MEAN 1.89 AND STANDARD DEVIATION 1.2401
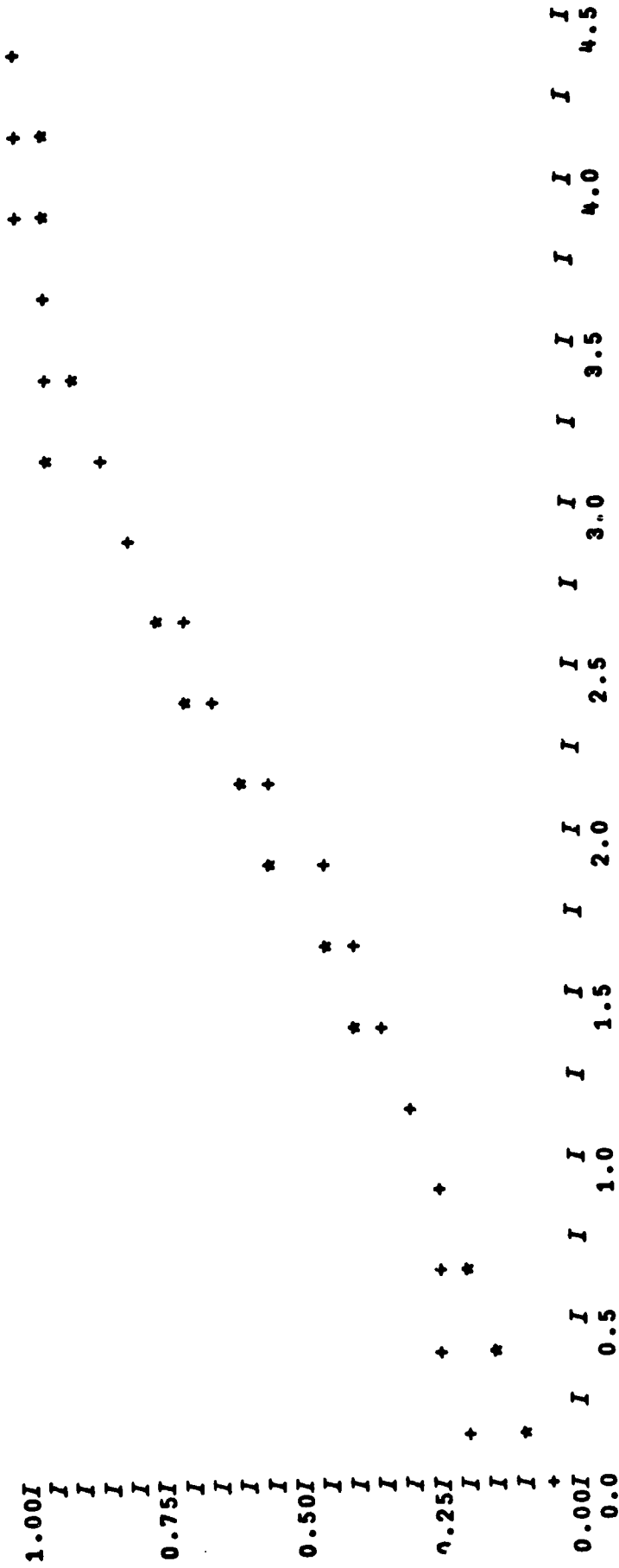
Key: F2* = +

Figure A3.4

CUMULATIVE DISTRIBUTIONS OF THIRD YEAR RECRUITER PRODUCTIVITY
F_3 AND NORMAL DISTRIBUTION F_3^* WITH MEAN 1.8518 AND STANDARD DEVIATION 1.21105

Key: F_3 = +
      F_3^* = *

Figure A3.5

CUMULATIVE DISTRIBUTIONS OF FOURTH YEAR RECRUITER PRODUCTIVITY
F_4 AND NORMAL DISTRIBUTION F_4^* WITH MEAN 1.9405 AND STANDARD DEVIATION 1.31815

Key: F_4 = +
       F_4^* = *
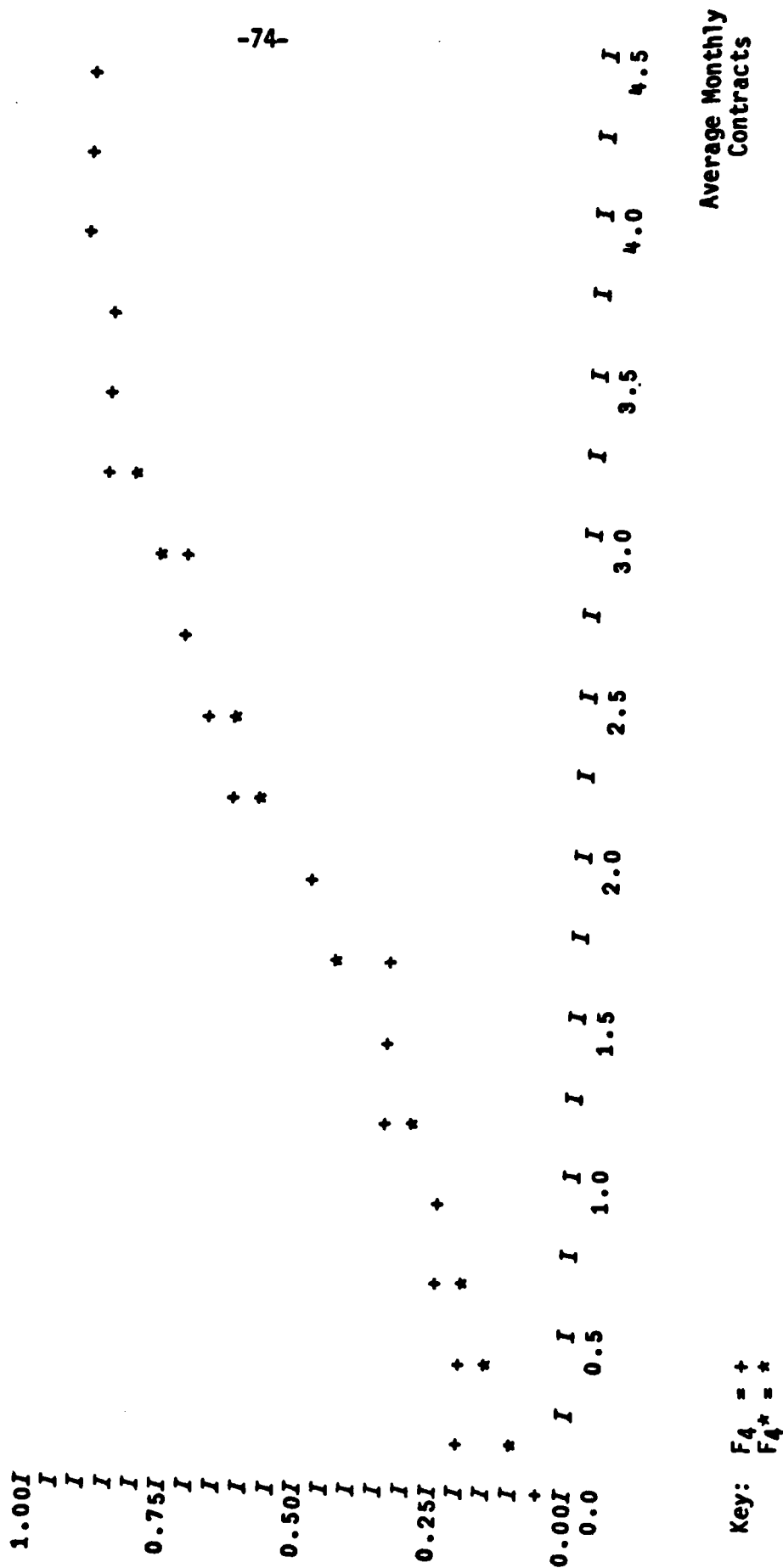
Our test statistics are then given by

$$\text{Max } D_i(x); \quad i = \text{1st half, 2nd half of 1st year, 2, 3, 4.}$$

The significance levels of the test statistics are found by the modified Kolmogorov-Smirnov test tables.

Table A3.1 to A3.5 give detailed breakdowns of the frequency and cumulative distributions of recruiter productivity in their respective years of service.

Tables A3.6 and A3.7 then gives the test statistics $D_i(x)$ for the test of F_i against F_i^*; $i = $ 1st half, 2nd half of 1st year, 1, 2, 3, and 4.

Table A3.1

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER
PRODUCTIVITY IN THEIR FIRST 6 MONTHS OF SERVICE

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.065	0.065
0 < x ≤ 0.5	0.138	0.203
0.5 < x ≤ 1.0	0.146	0.350
1.0 < x ≤ 1.5	0.293	0.642
1.5 < x ≤ 2.0	0.171	0.813
2.0 < x ≤ 2.5	0.106	0.919
2.5 < x ≤ 3.0	0.041	0.959
3.0 < x ≤ 3.5	0.024	0.984
3.5 < x ≤ 4.0	0.016	1.0
4.0 < x ≤ 4.5	0.0	1.0
4.5 < x ≤	0.0	1.0

Table A3.2

**FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER
PRODUCTIVITY IN THEIR SECOND 6 MONTHS OF SERVICE**

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.129	0.129
0 < x ≤ 0.5	0.091	0.220
0.5 < x ≤ 1.0	0.068	0.288
1.0 < x ≤ 1.5	0.136	0.424
1.5 < x ≤ 2.0	0.098	0.523
2.0 < x ≤ 2.5	0.197	0.720
2.5 < x ≤ 3.0	0.136	0.856
3.0 < x ≤ 3.5	0.061	0.917
3.5 < x ≤ 4.0	0.045	1.962
4.0 < x ≤ 4.5	0.008	1.970
4.5 < x ≤ 5.0	0.023	1.992
5.0 < x ≤ 5.5	0.0	0.992
5.5 < x ≤ 6.0	0.008	1.0

Table A3.3

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER PRODUCTIVITY IN THEIR SECOND YEAR OF SERVICE

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.071	0.071
$0 < x < 0.25$	0.134	0.205
$0.25 < x \leq 0.5$	0.031	0.236
$0.5 < x \leq 0.75$	0.024	0.26
$0.75 < x \leq 1.0$	0.008	0.268
$1.0 < x < 1.25$	0.039	0.307
$1.25 < x \leq 1.5$	0.063	0.37
$1.5 < x \leq 1.75$	0.031	0.402
$1.75 < x \leq 2$	0.047	0.449
$2 < x < 2.25$	0.102	0.551
$2.25 < x \leq 2.5$	0.087	0.638
$2.5 < x \leq 2.75$	0.087	0.724
$2.75 < x \leq 3$	0.079	0.803
$3 < x < 3.25$	0.071	0.874
$3.25 < x \leq 3.5$	0.055	0.929
$3.5 < x \leq 3.75$	0.016	0.945
$3.75 < x \leq 4$	0.031	0.976
$4 < x < 4.25$	0.008	0.984
$4.25 < x \leq 4.5$	0	0.984
$4.5 < x$	0.016	1

Table A3.4

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER PRODUCTIVITY IN THEIR THIRD YEAR OF SERVICE

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.129	0.129
$0 < x < 0.25$	0.043	0.171
$0.25 < x < 0.5$	0.029	0.2
$0.5 < x < 0.75$	0.029	0.229
$0.75 < x \leq 1.0$	0.043	0.271
$1.0 < x < 1.25$	0	0.271
$1.25 < x < 1.5$	0.086	0.357
$1.5 < x < 1.75$	0.086	0.443
$1.75 < x \leq 2$	0.086	0.529
$2 < x < 2.25$	0.071	0.6
$2.25 < x < 2.5$	0.086	0.686
$2.5 < x < 2.75$	0.086	0.686
$2.75 < x \leq 3$	0.1	0.871
$3 < x < 3.25$	0.014	0.886
$3.25 < x < 3.5$	0.029	0.914
$3.5 < x < 3.75$	0.014	0.929
$3.75 < x \leq 4$	0.029	0.957
$4 < x < 4.25$	0	0.957
$4.25 < x \leq 4.5$	0.029	0.986
$4.5 < x$	0.014	1

Table A3.5

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER
PRODUCTIVITY IN THEIR FOURTH YEAR OF SERVICE

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.048	0.048
0 < x < 0.25	0.143	0.19
0.25 < x $\leq$ 0.5	0	0.19
0.5 < x $\leq$ 0.75	0.071	0.262
0.75 < x $\leq$ 1.0	0	0.262
1.0 < x < 1.25	0.071	0.333
1.25 < x $\leq$ 1.5	0.024	0.357
1.5 < x $\leq$ 1.75	0	0.357
1.75 < x $\leq$ 2	0.143	0.5
2 < x < 2.25	0.143	0.643
2.25 < x $\leq$ 2.5	0.048	0.738
2.5 < x $\leq$ 2.75	0.048	0.738
2.75 < x $\leq$ 3	0	0.738
3 < x < 3.25	0.143	0.881
3.25 < x $\leq$ 3.5	0	0.881
3.5 < x $\leq$ 3.75	0.024	0.905
3.75 < x $\leq$ 4	0.024	0.929
4 < x < 4.25	0	0.929
4.25 < x $\leq$ 4.5	0	0.929
4.5 < x	0.071	1

Table A3.6

TEST STATISTICS FOR TESTS OF NORMALITY OF DISTRIBUTIONS OF RECRUITER PRODUCTIVITY

X	$D_i(x)$		
	i = 2	i = 3	i = 4
0	0.022	0.065	0.023
0.25	0.112 V	0.079 V	0.091 V
0.5	0.105	0.068	0.053
0.75	0.081	0.047	0.079
1	0.035	0.038	0.024
1.25	0.040	0.038	0.033
1.5	0.007	0.028	0.012
1.75	0.053	0.024	0.085
2	0.087	0.020	0.018
2.25	0.063	0.029	0.050
2.5	0.051	0.018	0.026
2.75	0.031	0.057	0.008
3	0.011	0.043	0.052
3.25	0.090	0.010	0.041
3.5	0.026	0.001	0.001
3.75	0.012	0.013	0.010
4	0.021	0.005	0.012
4.25	0.013	0.019	0.031
4.5 and above	0.002	0.000	0.045

Key = V: $\max_{x} D_i(x)$

Table A3.7

TEST STATISTICS FOR TESTS OF NORMALITY OF DISTRIBUTION OF RECRUITER
PRODUCTIVITY IN THEIR FIRST AND SECOND HALVES OF FIRST YEAR OF SERVICE

X	D(x)	
	1st half	2nd half
0	0.003	0.063
0.5	0.030	0.086 V
1.0	0.013	0.040
1.5	0.047 V	0.023
2.0	0.016	0.048
2.5	0.004	0.010
3.0	0.019	0.005
3.5	0.012	0.013
4.0	0.001	0.009
4.5	0.001	0.020
5.0	0.001	0.005
5.5	0.001	0.007
6.0	0.001	0.001

$$\text{Key} = V: \max_{x} D_i(x)$$

APPENDIX 4

Tests of Regional Differences in Distributions of Recruiter Productivity

Figures A4.1 to A4.4 plot the cumulative distributions of recruiter productivity in the 3 NRD's in the recruiters' first, second, third and fourth year of service.

Denote $F_{Ai}(x)$, $F_{Bi}(x)$ and $F_{Ci}(x)$ as the cumulative distributions of recruiter productivity in Albany, Atlanta, and Kansas City in the recruiters' with year of service; $i=1, 2, 3,$ and 4.

We want to test, for each i,

(1) H_0: $F_{Ai}(x) = F_{Bi}(x)$

H_1: $F_{Ai}(x) \neq F_{Bi}(x)$

(2) H_0: $F_{Ai}(x) = F_{Ci}(x)$

H_1: $F_{Ai}(x) \neq F_{Ci}(x)$

(3) H_0: $F_{Bi}(x) = F_{Ci}(x)$

H_1: $F_{Bi}(x) \neq F_{Ci}(x)$

Again we use the Kolmogorov-Smirnov Two-Sample Test for this purpose. Define

$$D_i^1(x) = |F_{Ai}(x) - F_{Bi}(x)|,$$

$$D_i^2(x) = |F_{Ai}(x) - F_{Ci}(x)|, \quad \text{and}$$

$$D_i^3(x) = |F_{Bi}(x) - F_{Ci}(x)|.$$

$D_i^1(x)$, $D_i^2(x)$, and $D_i^3(x)$ can be computed from Tables A5.1-12 in Appendix 5.

The test statistics for the three tests are given by

$$\text{Max}_X D_i^1(x)$$

$$\text{Max}_X D_i^2(x)$$

and Max $D_i^3(x)$, respectively.

Tables A4.1 to A4.4 gives the values of $D_i^1(x)$, $D_i^2(x)$, and $D_i^3(x)$ from which the test statistics can be found.

Figure A4.1

CUMULATIVE DISTRIBUTIONS OF F$_{A1}$, F$_{B1}$, and F$_{C1}$
(First Year of Service)
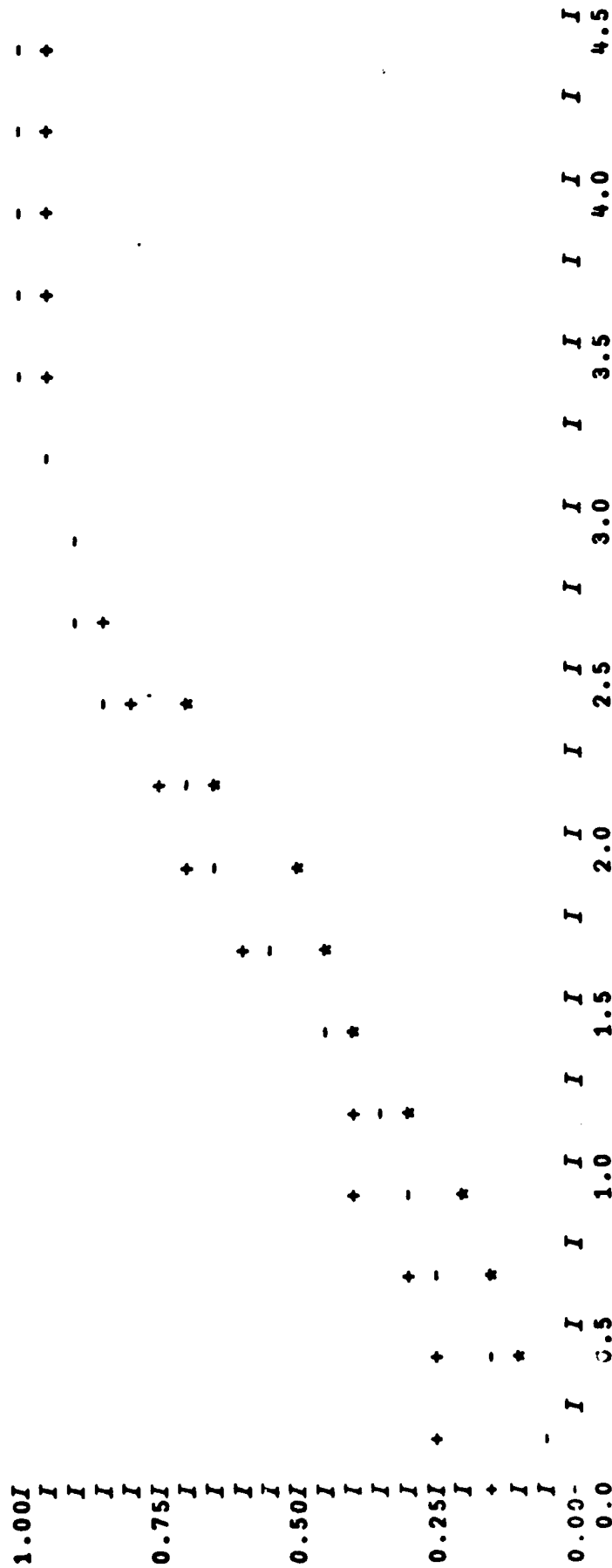
Key: F$_{A1}$ = *
      F$_{B1}$ = +
      F$_{C1}$ = –

Figure A4.2

CUMULATIVE DISTRIBUTIONS OF F_{A2}, F_{B2}, and F_{C2}
(Second Year of Service)

Average Monthly
Contracts

Key: F_{A2} = *
      F_{B2} = +
      F_{C2} = –

Figure A4.3

CUMULATIVE DISTRIBUTIONS OF F_{A3}, F_{B3}, and F_{C3}
(Third Year of Service)

Average Monthly
Contracts

Key: F_{A3} = *
       F_{B3} = +
       F_{C3} = -

Figure A4.4

CUMULATIVE DISTRIBUTIONS OF FA4, FB4, and FC4
(Fourth Year of Service)

```
1.00I                                           +        -
    I
    I
    I
    I
0.75I                          -        +
    I
    I                          -        *
    I
0.50I              +        -           *
    I              +        -           *
    I           +        -                 *
    I        +        -        *
    I        +        -    *
0.25I     +        -    *
    I     +     -        *
    I   +     -  *
    I  +   -  *
0.00- *
0.0   0.5   1.0   1.5   2.0   2.5   3.0   3.5   4.0   4.5
```

Average Monthly
Contracts

Key: FA4 = *
      FB4 = +
      FC4 = -

Table A4.1

REGIONAL DIFFERENCES BETWEEN THE DISTRIBUTIONS, FIRST YEAR

X	Albany vs. Atlanta	Albany vs. Kansas City	Atlanta vs. Kansas City
0	0.131	0.019	0.112
0.25	0.177	0.011	0.188 V
0.5	0.159	0.070	0.089
0.75	0.14	0.095	0.045
1	0.153	0.064	0.089
1.25	0.083	0.017	0.067
1.5	0.045	0.048	0.003
1.75	0.176	0.107	0.068
2	0.204 V	0.137	0.067
2.25	0.133	0.074	0.059
2.5	0.113	0.139 V	0.026
2.75	0.008	0.040	0.032
3	0.022	0.044	0.021
3.25	0.003	0.011	0.008
3.5	0.003	0.05	0.046
3.75	0.031	0.015	0.046
4	0.015	0.034	0.049
4.25	0.002	0.034	0.033
4.5 and above	0.016	0.017	0.033

Key = V - Test Statistic

Table A4.2

REGIONAL DIFFERENCES BETWEEN THE DISTRIBUTIONS, SECOND YEAR

X	Albany vs. Atlanta	Albany vs. Kansas City	Atlanta vs. Kansas City
0	0.087	0.085	0.002
0.25	0.135 V	0.054	0.081
0.5	0.131	0.075	0.056
0.75	0.127	0.072	0.055
1	0.101	0.045	0.055
1.25	0.123	0.138	0.016
1.5	0.088	0.129	0.041
1.75	0.062	0.173 V	0.111
2	0.032	0.19	0.158
2.25	0.011	0.151	0.162
2.5	0.027	0.116	0.143
2.75	0.066	0.103	0.170
3	0.03	0.144	0.174 V
3.25	0.068	0.085	0.153
3.5	0.058	0.006	0.065
3.75	0.063	0.02	0.042
4	0.067	0	0.067
4.25	0.044	0	0.044
4.5 and above	0.044	0	0.044

Key = V - Test Statistic

Table A4.3

REGIONAL DIFFERENCES BETWEEN THE DISTRIBUTIONS, THIRD YEAR

. X	Albany vs. Atlanta	Albany vs. Kansas City	Atlanta vs. Kansas City
0	0.031	0.121	0.089
0.25	0.083	0.089	0.006
0.5	0.125	0.161	0.036
0.75	0.094	0.201	0.107
1	0.031	0.210	0.179
1.25	0.031	0.210	0.179
1.5	0.094	0.228 V	0.321 V
1.75	0.104	0.205	0.310
2	0.073	0.112	0.185
2.25	0.01	0.049	0.060
2.5	0.021	0.027	0.048
2.75	0.146	0.045	0.19
3	0.156 V	0.094	0.25
3.25	0.115	0.094	0.208
3.5	0.031	0.094	0.125
3.75	0.063	0.063	0.125
4	0.052	0.031	0.083
4.25	0.052	0.031	0.083
4.5 and above	0.031	0.031	0

Key = V - Test Statistic

Table A4.4

REGIONAL DIFFERENCES BETWEEN THE DISTRIBUTIONS, FOURTH YEAR

X	Albany vs. Atlanta	Albany vs. Kansas City	Atlanta vs. Kansas City
0	0.052	0.048	0.1
0.25	0.157	0.039	0.118
0.5	0.157	0.039	0.118
0.75	0.357 V	0.13	0.227 V
1	0.357 V	0.13	0.227 V
1.25	0.262	0.126	0.136
1.5	0.214	0.078	0.136
1.75	0.214	0.078	0.136
2	0.219	0.255 V	0.036
2.25	0.276	0.203	0.073
2.5	0.329	0.156	0.173
2.75	0.233	0.061	0.173
3	0.233	0.061	0.173
3.25	0.043	0.052	0.009
3.5	0.043	0.052	0.009
3.75	0.005	0.004	0.009
4	0.095	0.004	0.091
4.25	0.095	0.004	0.091
4.5 and above	0.095	0.004	0.091

Key = V - Test Statistic

APPENDIX 5

Figure A5.1

FREQUENCY FUNCTION OF AVERAGE MONTLY CONTRACTS
(First Year of Service)

ALBANY
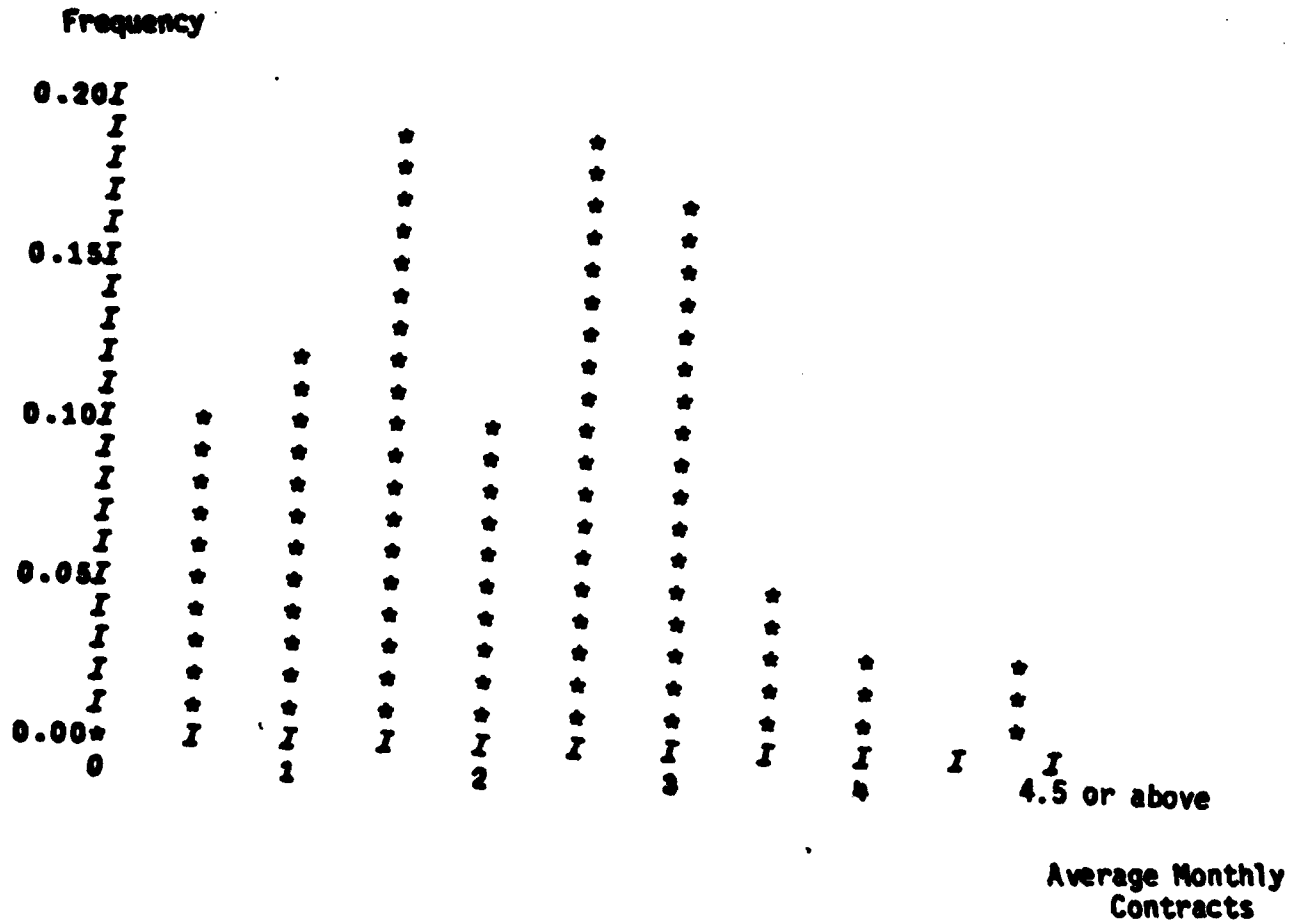
Figure A5.2

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
(First Year of Service)

ATLANTA
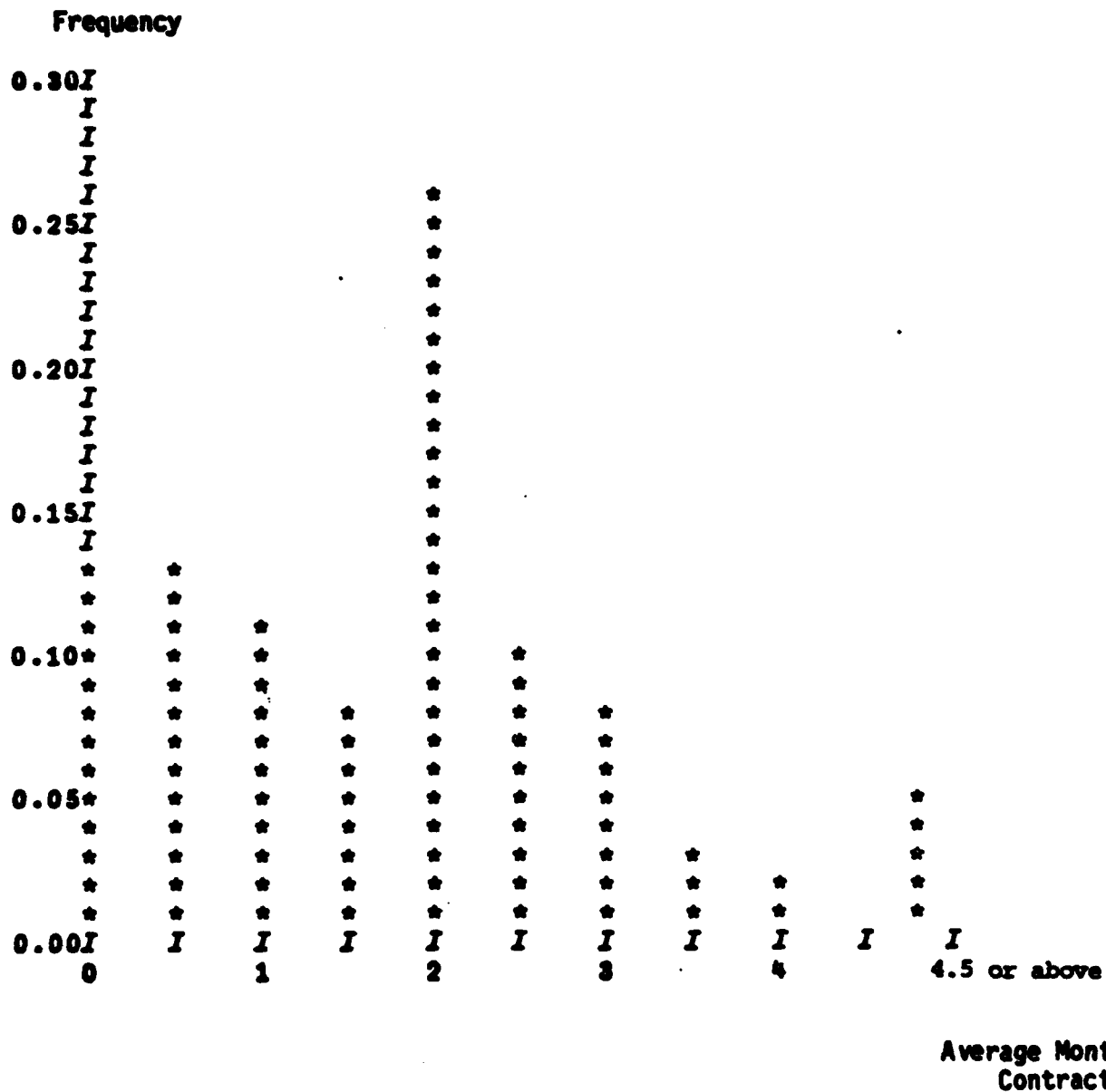
Figure A5.3

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
(First Year of Service)

KANSAS CITY

Frequency

```
0.20I                     *       *
     I                     *       *
     I                     *       *
     I             *       *       *
     I             *       *       *
0.15I     *       *       *       *
     I     *       *       *       *
     I     *       *       *       *
     I     *   *   *       *       *
     I     *   *   *       *       *
0.10I     *   *   *       *       *
     I     *   *   *       *       *
     I     *   *   *       *   *
     I     *   *   *       *   *
     I     *   *   *       *   *   *
0.05I     *   *   *   *   *   *
     I     *   *   *   *   *   *
     I     *   *   *   *   *   *
     *     *   *   *   *   *   *   *
     *     *   *   *   *   *   *   *
0.00I   I   I   I   I   I   I   I   I   * I
     0     1       2       3       4      4.5 or above
```

Average Monthly
Contracts
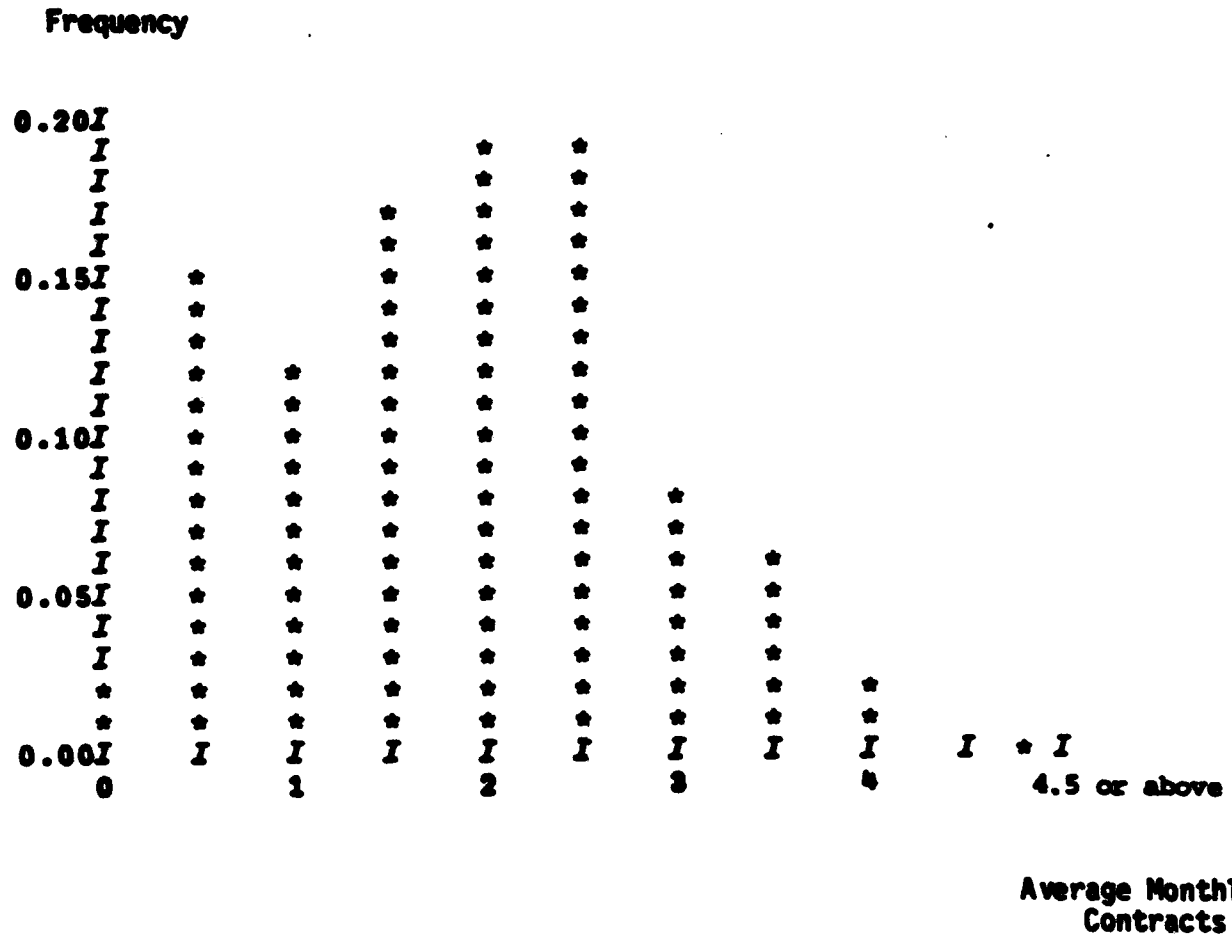
Figure A5.4

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
(Second Year of Service)

ALBANY

Frequency

Average Monthly
Contracts
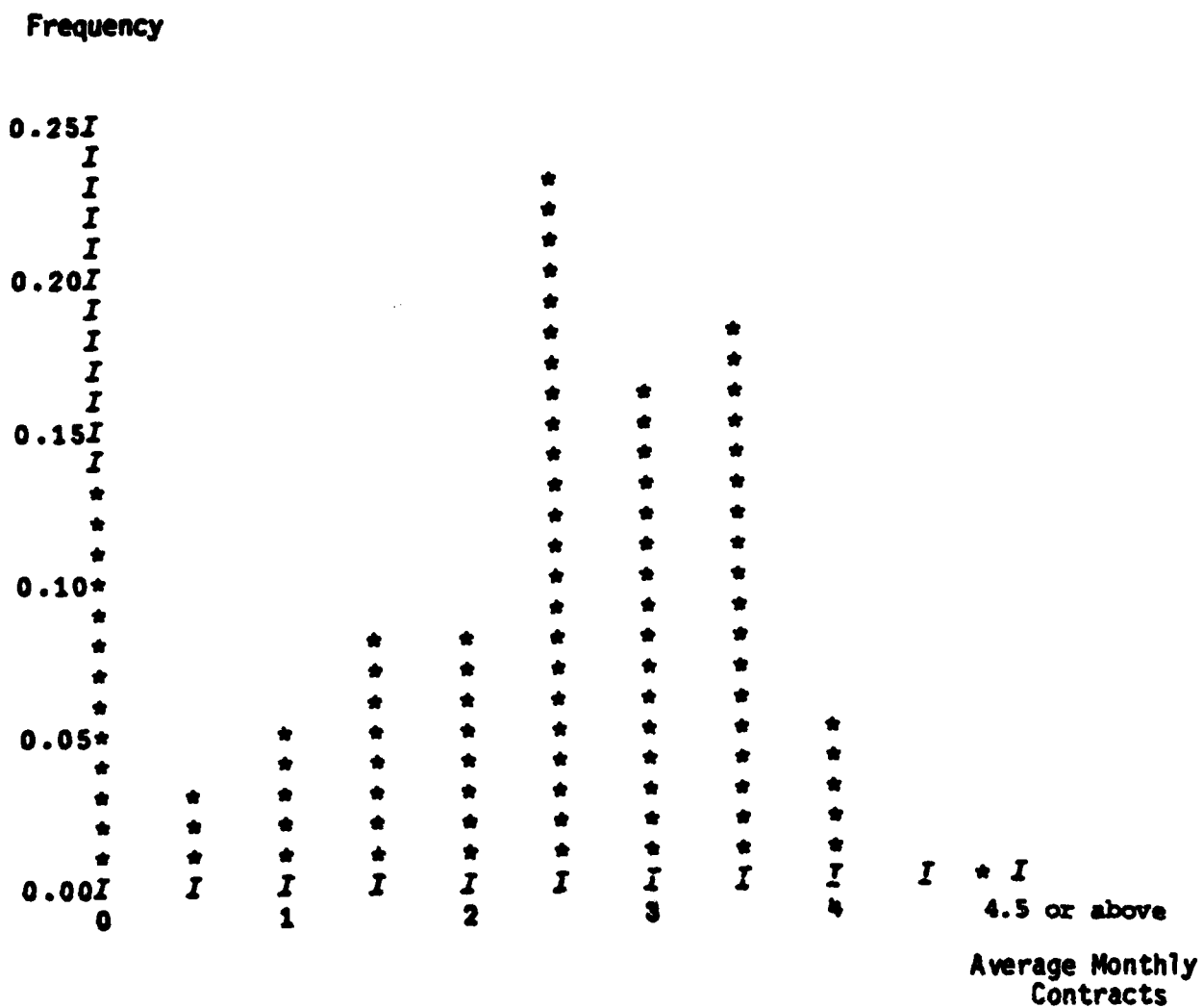
Figure A5.6

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
(Second Year of Service)

KANSAS CITY

Frequency

```
0.20I
    I      *                        *
    I      *                        *
    I      *                        *
    I      *         *         *    *
0.15I      *         *         *    *
    I      *         *    *    *    *
    I      *         *    *    *    *
    I      *         *    *    *    *
    I      *         *    *    *    *
0.10I      *         *    *    *    *
    I      *         *    *    *    *
    I      *         *    *    *    *
    I      *         *    *    *    *
    I      *         *    *    *    *
0.05*      *         *    *    *    *    *    *
    *      *         *    *    *    *    *    *
    *      *         *    *    *    *    *    *
    *      *    *    *    *    *    *    *    *
    *      *    *    *    *    *    *    *    *
0.00I  I   I    I    I    I    I    I    I  I * I
    0      1         2    3         4          4.5 or above
```

Average Monthly
Contracts
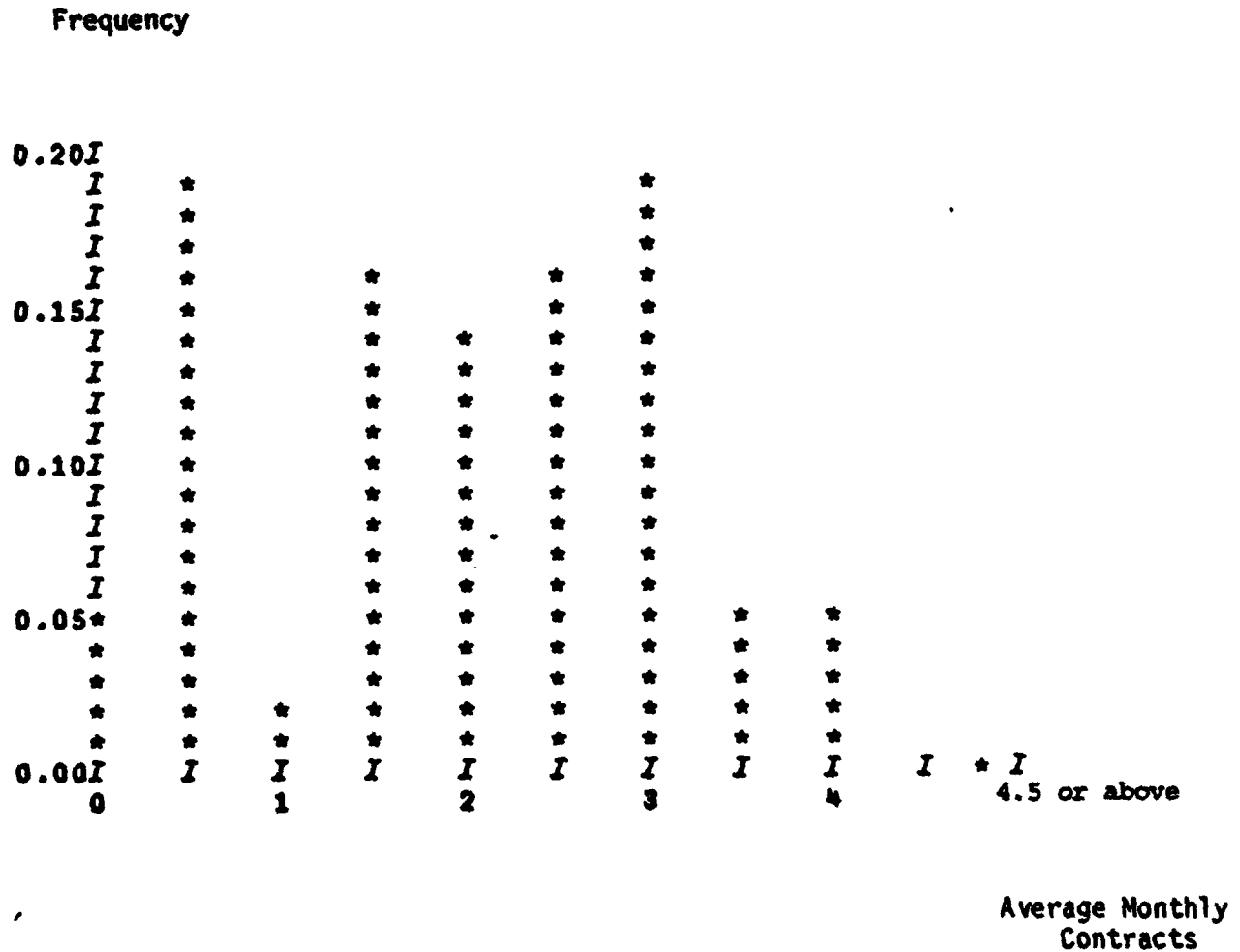
Figure A5.7

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
(Third Year of Service)

ALBANY

Frequency

```
0.25I
     I
     I
     I                                    *
     I                                    *
0.20I                                     *
     I                           *        *
     I                           *        *
     I                           *        *
     I                           *        *
0.15I                           *    *   *
     I                           *    *   *
     I                     *     *    *   *
     I                     *     *    *   *
     I                     *     *    *   *
0.10I                     *     *    *   *
     *              *     *     *    *   *
     *              *     *     *    *   *
     *              *     *     *    *   *
     *              *     *     *    *   *           *
0.05*              *     *     *    *   *           *
     *              *     *     *    *   *           *
     *        *     *     *     *    *   *           *        *
     *        *     *     *     *    *   *           *        *
     *        *     *     *     *    *   *           *        *
0.00I    I    I     I     I     I    I         I    I    I
     0         1          2          3              4      4.5 or above
```

Average Monthly
Contracts
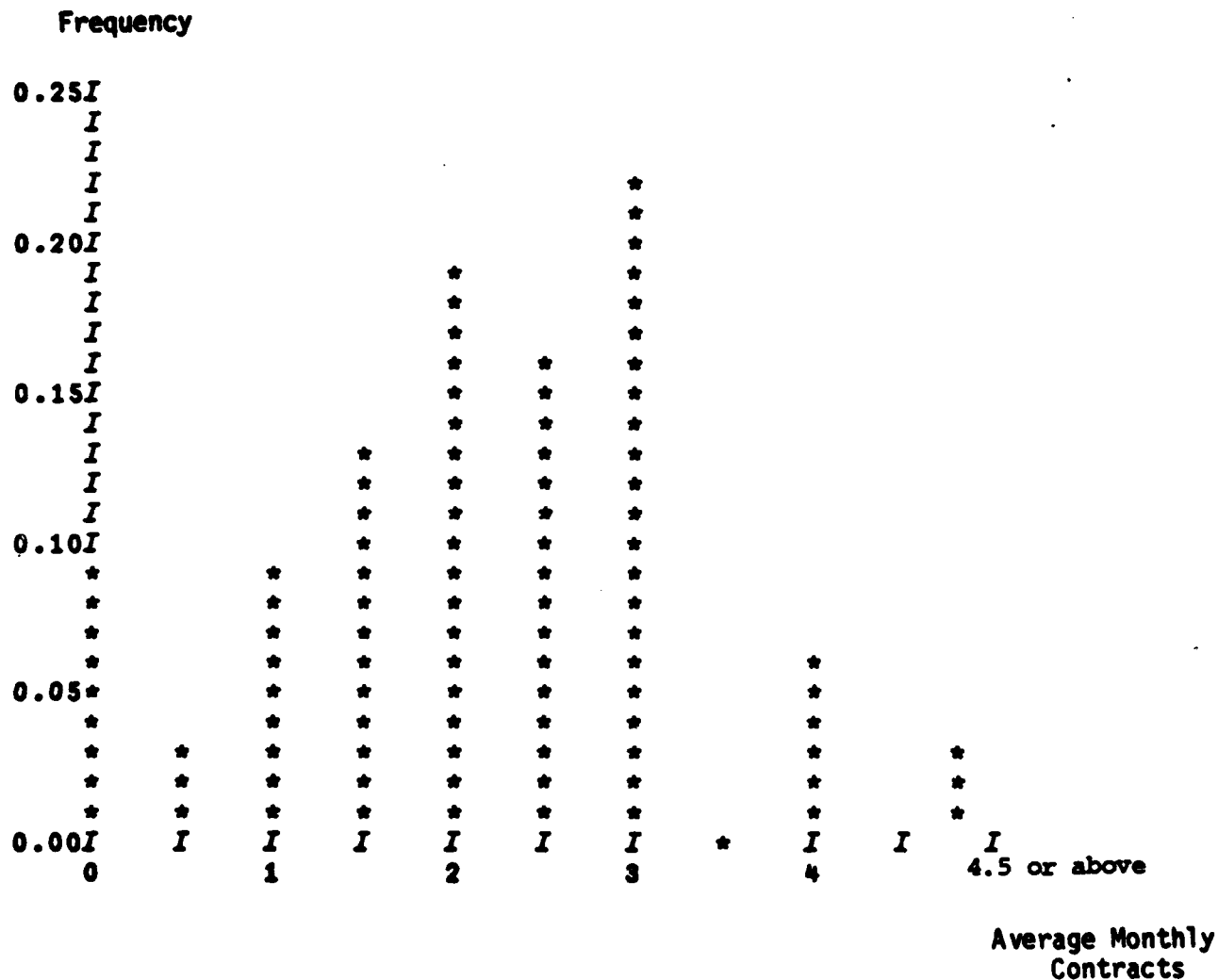
Figure A5.8

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
(Third Year of Service)

ATLANTA

Frequency

Average Monthly
Contracts
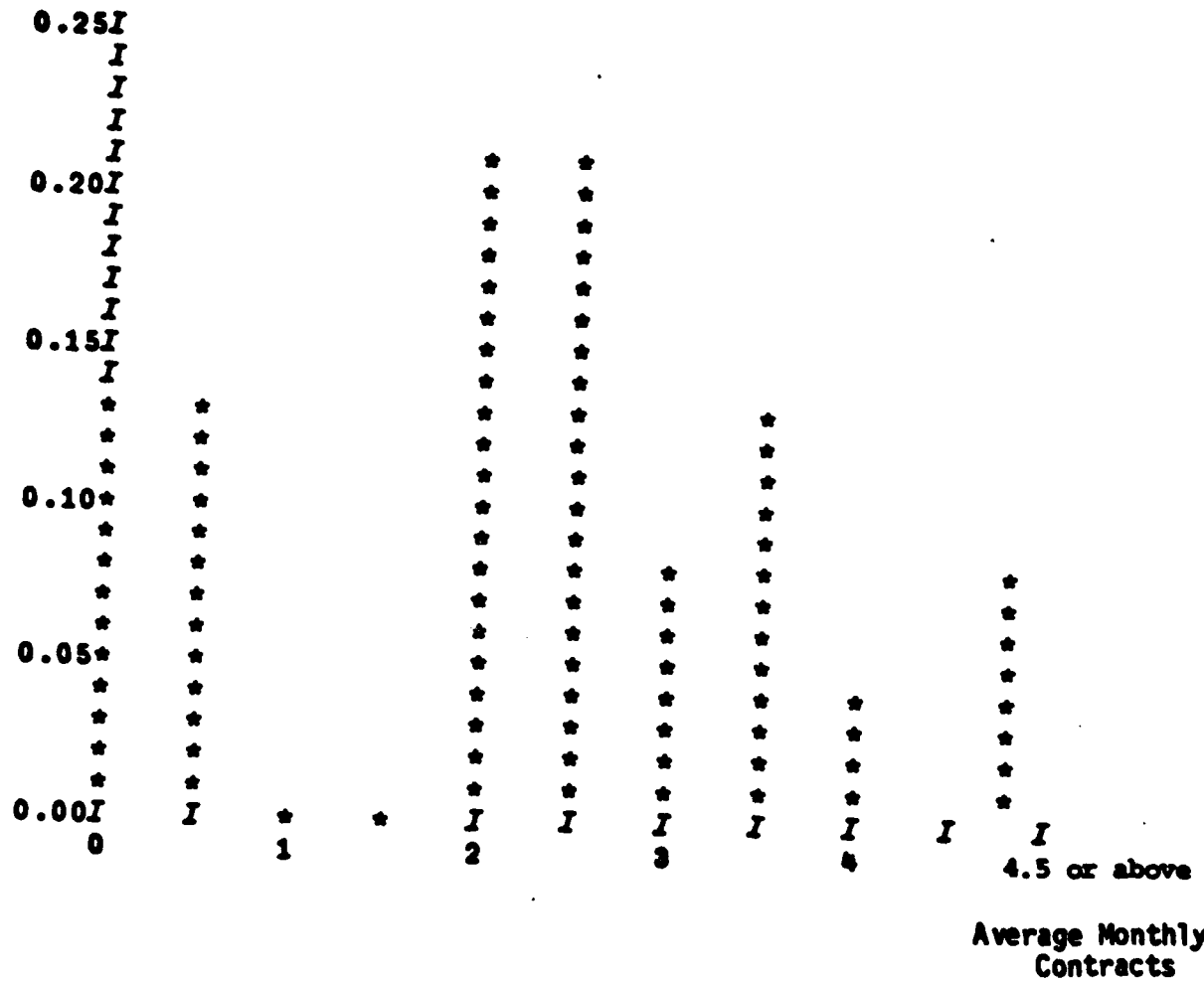
Figure A5.9

FREQUENCY FUNCTION OF AVERAGE MONTHLY CONTRACTS
(Third Year of Service)

KANSAS CITY

Frequency

```
0.30I                                        *
    I                                        *
    I                                        *
    I                                        *
    I                                        *
0.25I                                        *
    I                                        *
    I                                        *
    I                                        *
    I                                        *
0.20*                                        *
    *                                        *
    *                                        *
    *                                        *
    *                                        *
0.15*              *         *               *
    *              *         *               *
    *              *         *               *
    *              *         *               *
    *              *         *               *
0.10*              *         *               *
    *              *         *               *
    *       *      *         *      *      *  *
    *       *      *         *      *      *  *
0.05*       *      *         *      *      *  *
    *       *      *         *      *      *  *
    *       *      *         *      *      *  *
    *       *      *         *      *      *  *
    *       *      *         *      *      *  *
0.00I   I       I      I       I      I      I      *      *      I  *  I
    0           1          2          3      4          4.5 or above
```

Average Monthly
Contracts
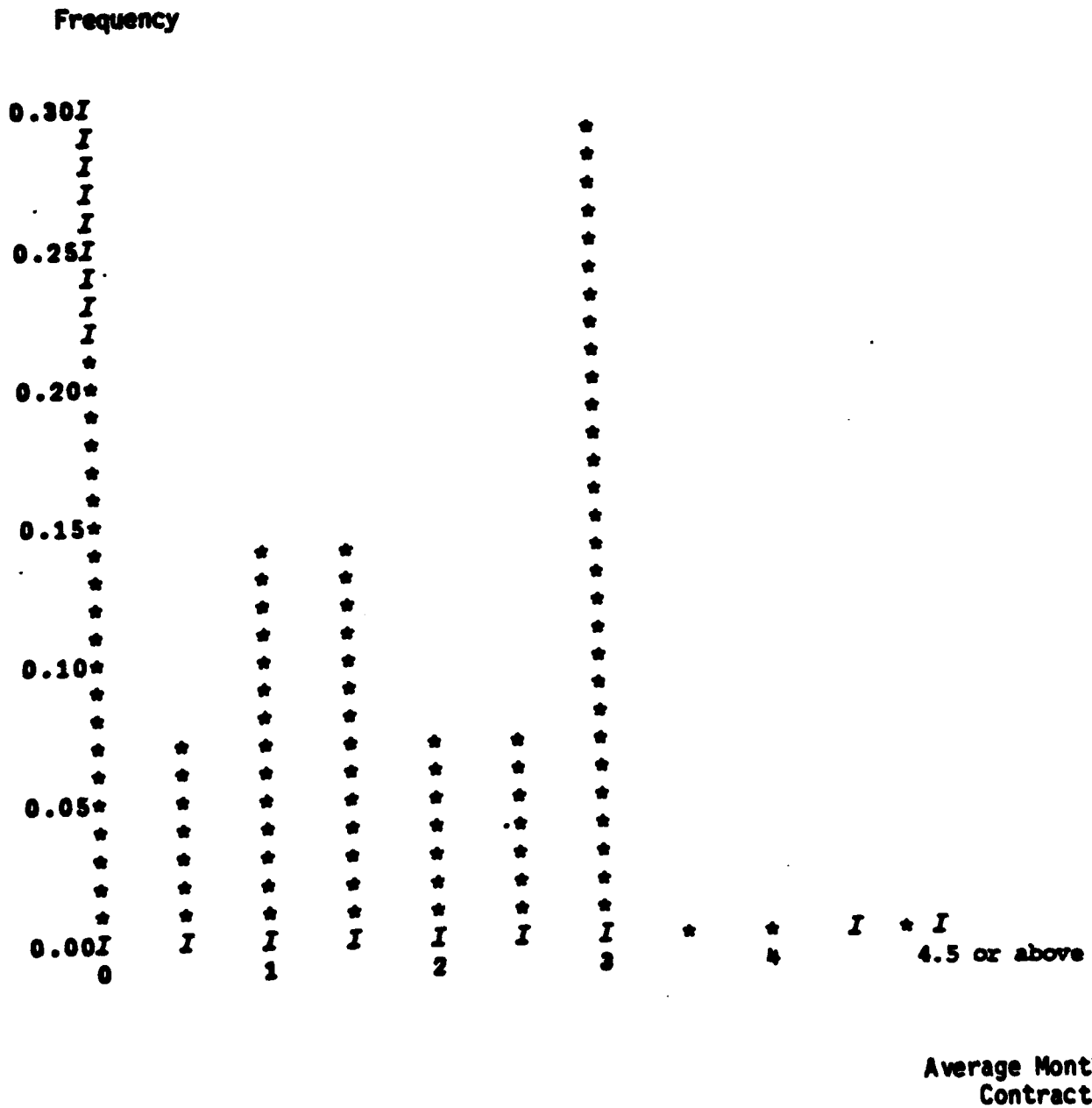
Figure A5.10

FREQUENCY FUNCTION OF AVERAGE MONTLY CONTRACTS
(Fourth Year of Service)

ALBANY

Frequency

Average Monthly
Contracts
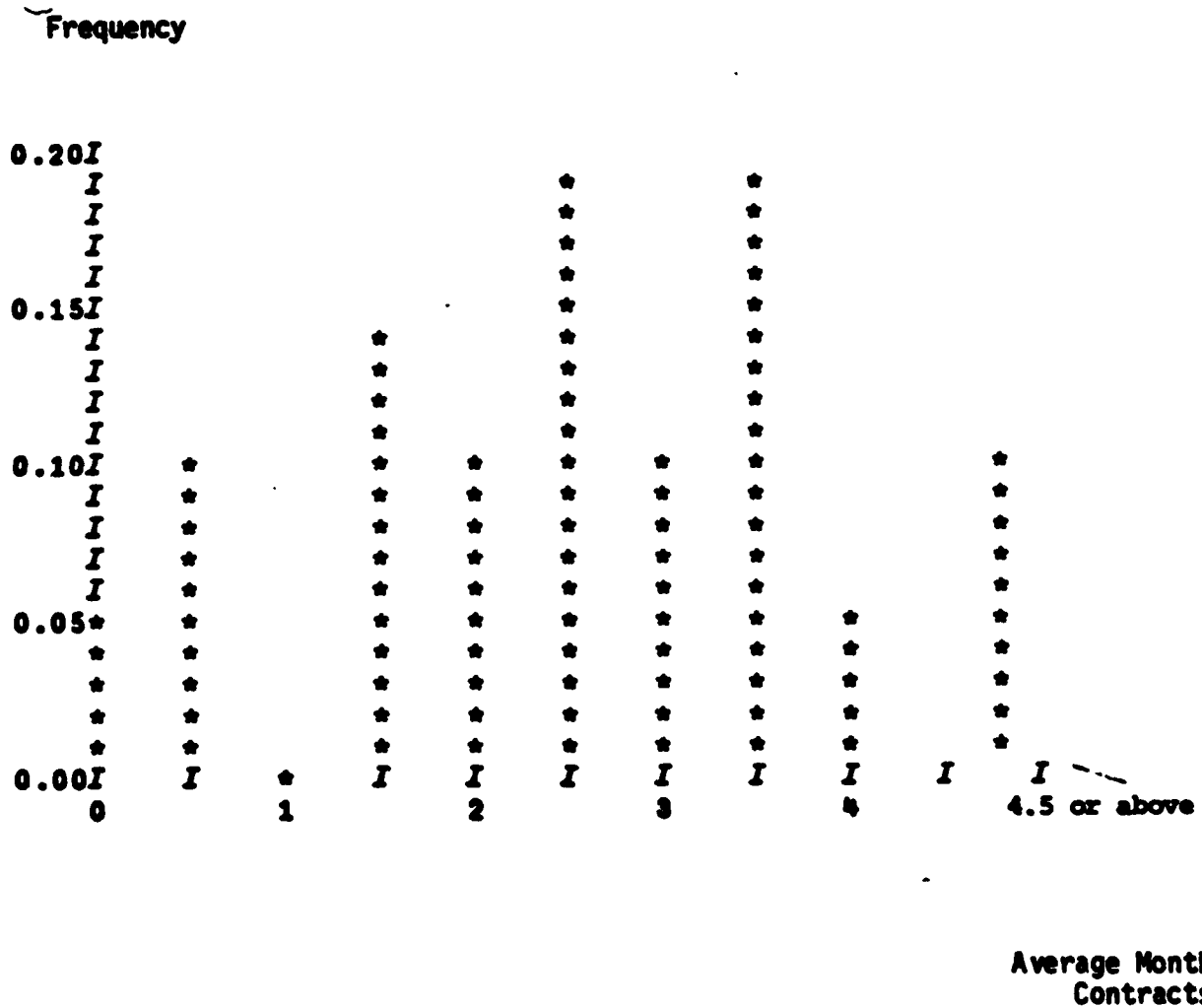
Figure A5.11

FREQUENCY FUNCTION OF AVERAGE MONTLY CONTRACTS
(Fourth Year of Service)

ATLANTA

Average Monthly
Contracts
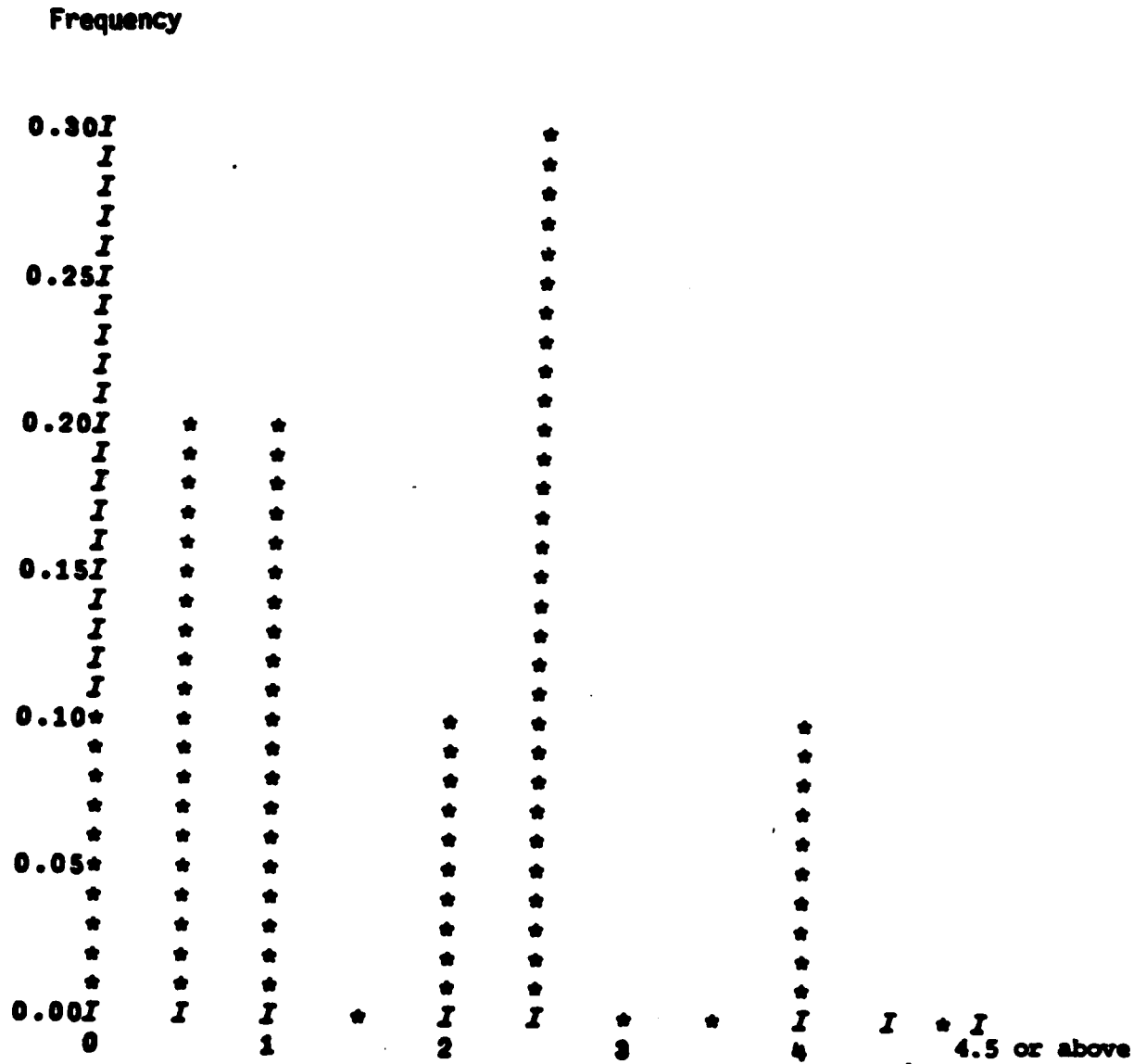
Figure A5.12

FREQUENCY FUNCTION OF AVERAGE MONTLY CONTRACTS
(Fourth Year of Service)

KANSAS CITY
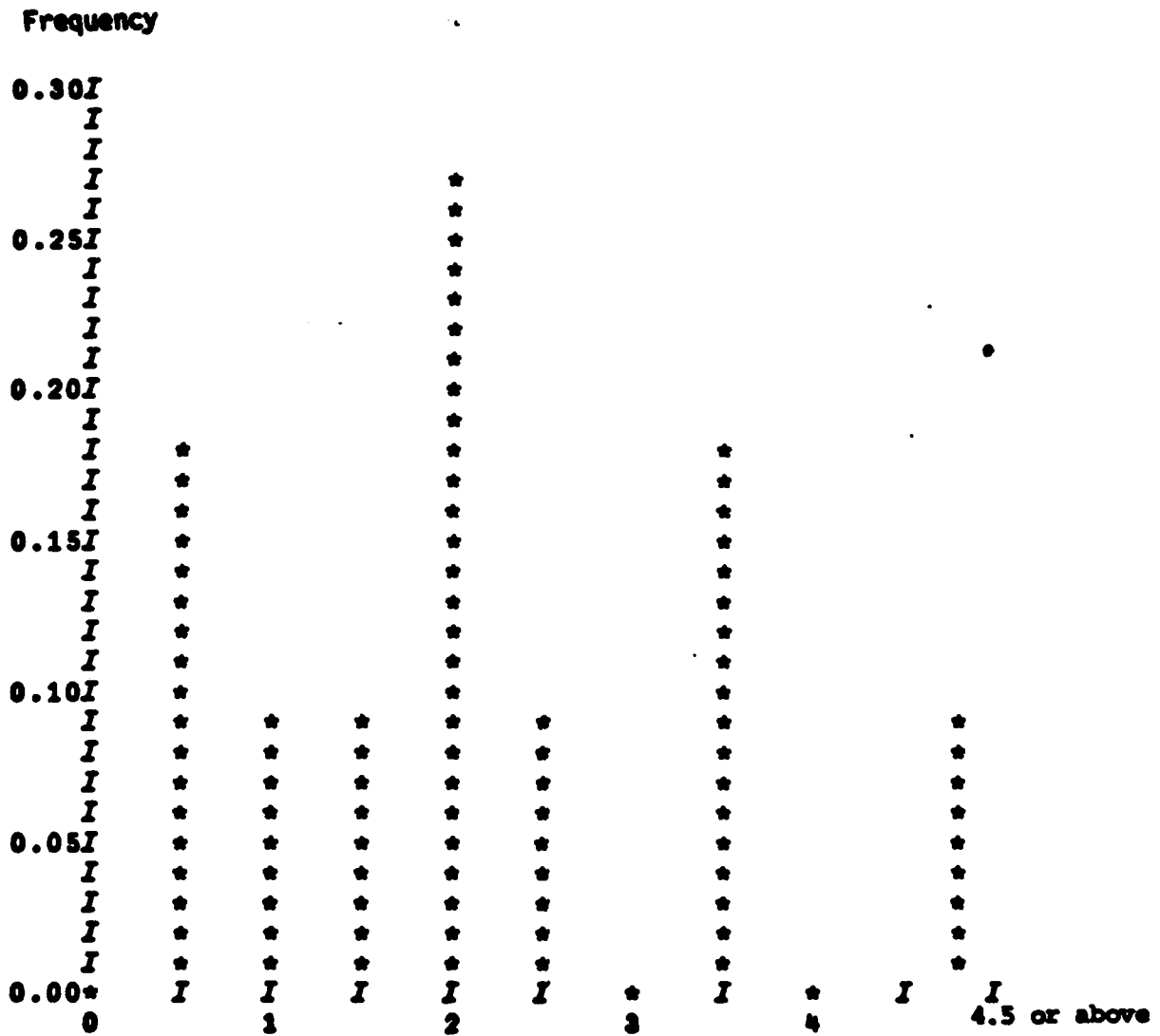
Frequency

Average Monthly
Contracts

Table A5.1

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER PERFORMANCE IN THEIR FIRST YEAR OF SERVICE

ALBANY

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0	0
0 < x < 0.25	0.069	0.069
0.25 < x $\leq$ 0.5	0.034	0.103
0.5 < x $\leq$ 0.75	0.052	0.155
0.75 < x $\leq$ 1.0	0.069	0.224
1.0 < x < 1.25	0.086	0.31
1.25 < x $\leq$ 1.5	0.103	0.414
1.5 < x $\leq$ 1.75	0.017	0.431
1.75 < x $\leq$ 2	0.086	0.517
2 < x < 2.25	0.121	0.638
2.25 < x $\leq$ 2.5	0.069	0.707
2.5 < x $\leq$ 2.75	0.138	0.845
2.75 < x $\leq$ 3	0.034	0.879
3 < x < 3.25	0.052	0.931
3.25 < x $\leq$ 3.5	0	0.931
3.5 < x $\leq$ 3.75	0.034	0.966
3.75 < x $\leq$ 4	0	0.966
4 < x < 4.25	0	0.966
4.25 < x $\leq$ 4.5	0.017	0.983
4.5 < x	0.017	1.000

Table A5.2

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER PERFORMANCE IN THEIR SECOND YEAR OF SERVICE

ALBANY

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.132	0.132
0 < x < 0.25	0	0.132
0.25 < x ⪦ 0.5	0.026	0.158
0.5 < x ⪦ 0.75	0.026	0.184
0.75 < x ⪦ 1.0	0.026	0.211
1.0 < x < 1.25	0	0.211
1.25 < x ⪦ 1.5	0.079	0.289
1.5 < x ⪦ 1.75	0.026	0.316
1.75 < x ⪦ 2	0.053	0.368
2 < x < 2.25	0.132	0.5
2.25 < x ⪦ 2.5	0.105	0.605
2.5 < x ⪦ 2.75	0.105	0.711
2.75 < x ⪦ 3	0.053	0.763
3 < x < 3.25	0.105	0.868
3.25 < x ⪦ 3.5	0.079	0.947
3.5 < x ⪦ 3.75	0.026	0.974
3.75 < x ⪦ 4	0.026	1
4 < x < 4.25	0	1
4.25 < x ⪦ 4.5	0	1
4.5 < x	0	1

Table A5.3

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER PERFORMANCE IN THEIR THIRD YEAR OF SERVICE

ALBANY

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.094	0.094
0 < x < 0.25	0.031	0.125
0.25 < x ≲ 0.5	0	0.125
0.5 < x ≲ 0.75	0.031	0.156
0.75 < x ≲ 1.0	0.063	0.219
1.0 < x < 1.25	0	0.219
1.25 < x ≲ 1.5	0.125	0.344
1.5 < x ≲ 1.75	0.094	0.438
1.75 < x ≲ 2	0.094	0.531
2 < x < 2.25	0.063	0.594
2.25 < x ≲ 2.5	0.094	0.688
2.5 < x ≲ 2.75	0.125	0.813
2.75 < x ≲ 3	0.094	0.906
3 < x < 3.25	0	0.906
3.25 < x ≲ 3.5	0	0.906
3.5 < x ≲ 3.75	0.031	0.938
3.75 < x ≲ 4	0.031	0.969
4 < x < 4.25	0	0.969
4.25 < x ≲ 4.5	0	0.969
4.5 < x	0.031	1

Table A5.4

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER
PERFORMANCE IN THEIR FOURTH YEAR OF SERVICE

ALBANY

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.048	0.048
0 < x < 0.25	0.095	0.143
0.25 < x $\leq$ 0.5	0	0.143
0.5 < x $\leq$ 0.75	0	0.143
0.75 < x $\leq$ 1.0	0	0.143
1.0 < x < 1.25	0.095	0.238
1.25 < x $\leq$ 1.5	0.048	0.286
1.5 < x $\leq$ 1.75	0	0.286
1.75 < x $\leq$ 2	0.095	0.381
2 < x < 2.25	0.143	0.524
2.25 < x $\leq$ 2.5	0.048	0.571
2.5 < x $\leq$ 2.75	0.095	0.667
2.75 < x $\leq$ 3	0	0.667
3 < x < 3.25	0.19	0.857
3.25 < x $\leq$ 3.5	0	0.857
3.5 < x $\leq$ 3.75	0.048	0.905
3.75 < x $\leq$ 4	0	0.905
4 < x < 4.25	0	0.905
4.25 < x $\leq$ 4.5	0	0.905
4.5 < x	0.095	1

Table A5.5

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER PERFORMANCE IN THEIR FIRST YEAR OF SERVICE

ATLANTA

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.131	0.131
0 < x < 0.25	0.115	0.246
0.25 < x ⪝ 0.5	0.016	0.262
0.5 < x ⪝ 0.75	0.033	0.295
0.75 < x ⪝ 1.0	0.082	0.377
1.0 < x < 1.25	0.016	0.393
1.25 < x ⪝ 1.5	0.066	0.459
1.5 < x ⪝ 1.75	0.148	0.607
1.75 < x ⪝ 2	0.115	0.721
2 < x < 2.25	0.049	0.77
2.25 < x ⪝ 2.5	0.033	0.82
2.5 < x ⪝ 2.75	0.049	0.852
2.75 < x ⪝ 3	0.033	0.902
3 < x < 3.25	0.033	0.934
3.25 < x ⪝ 3.5	0	0.934
3.5 < x ⪝ 3.75	0	0.934
3.75 < x ⪝ 4	0.016	0.951
4 < x < 4.25	0.016	0.967
4.25 < x ⪝ 4.5	0	0.967
4.5 < x	0.033	1

Table A5.6

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER
PERFORMANCE IN THEIR SECOND YEAR OF SERVICE

ATLANTA

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.044	0.044
0 < x < 0.25	0.222	0.267
0.25 < x ⪝ 0.5	0.022	0.289
0.5 < x ⪝ 0.75	0.022	0.311
0.75 < x ⪝ 1.0	0	0.311
1.0 < x < 1.25	0.022	0.333
1.25 < x ⪝ 1.5	0.044	0.378
1.5 < x ⪝ 1.75	0	0.378
1.75 < x ⪝ 2	0.022	0.4
2 < x < 2.25	0.089	0.489
2.25 < x ⪝ 2.5	0.089	0.578
2.5 < x ⪝ 2.75	0.067	0.644
2.75 < x ⪝ 3	0.089	0.733
3 < x < 3.25	0.067	0.8
3.25 < x ⪝ 3.5	0.089	0.899
3.5 < x ⪝ 3.75	0.022	0.911
3.75 < x ⪝ 4	0.022	0.933
4 < x < 4.25	0.022	0.956
4.25 < x ⪝ 4.5	0	0.956
4.5 < x	0.044	1

Table A5.7

**FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER
PERFORMANCE IN THEIR THIRD YEAR OF SERVICE**

ATLANTA

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.125	0.125
$0 < x < 0.25$	0.083	0.208
$0.25 < x \leq 0.5$	0.042	0.25
$0.5 < x \leq 0.75$	0	0.25
$0.75 < x \leq 1.0$	0	0.25
$1.0 < x < 1.25$	0	0.25
$1.25 < x \leq 1.5$	0	0.25
$1.5 < x \leq 1.75$	0.083	0.333
$1.75 < x \leq 2$	0.125	0.458
$2 < x < 2.25$	0.125	0.583
$2.25 < x \leq 2.5$	0.083	0.667
$2.5 < x \leq 2.75$	0	0.667
$2.75 < x \leq 3$	0.083	0.75
$3 < x < 3.25$	0.042	0.792
$3.25 < x \leq 3.5$	0.083	0.875
$3.5 < x \leq 3.75$	0	0.875
$3.75 < x \leq 4$	0.042	0.917
$4 < x < 4.25$	0	0.917
$4.25 < x \leq 4.5$	0.083	1
$4.5 < x$	0	1

Table A5.8

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER PERFORMANCE IN THEIR FOURTH YEAR OF SERVICE

ATLANTA

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.1	0.1
$0 < x < 0.25$	0.2	0.3
$0.25 < x \leq 0.5$	0	0.3
$0.5 < x \leq 0.75$	0.2	0.5
$0.75 < x \leq 1.0$	0	0.5
$1.0 < x < 1.25$	0	0.5
$1.25 < x \leq 1.5$	0	0.5
$1.5 < x \leq 1.75$	0	0.5
$1.75 < x \leq 2$	0.1	0.6
$2 < x < 2.25$	0.2	0.8
$2.25 < x \leq 2.5$	0.1	0.9
$2.5 < x \leq 2.75$	0	0.9
$2.75 < x \leq 3$	0	0.9
$3 < x < 3.25$	0	0.9
$3.25 < x \leq 3.5$	0	0.9
$3.5 < x \leq 3.75$	0	0.9
$3.75 < x \leq 4$	0.1	1
$4 < x \leq 4.25$	0	1
$4.25 < x \leq 4.5$	0	1
$4.5 < x$	0	1

Table A5.9

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER
PERFORMANCE IN THEIR FIRST YEAR OF SERVICE

KANSAS CITY

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.019	0.019
$0 < x < 0.25$	0.038	0.058
$0.25 < x \leq 0.5$	0.115	0.173
$0.5 < x \leq 0.75$	0.077	0.25
$0.75 < x \leq 1.0$	0.038	0.288
$1.0 < x < 1.25$	0.038	0.327
$1.25 < x \leq 1.5$	0.135	0.462
$1.5 < x \leq 1.75$	0.077	0.538
$1.75 < x \leq 2$	0.115	0.654
$2 < x < 2.25$	0.058	0.712
$2.25 < x \leq 2.5$	0.135	0.846
$2.5 < x \leq 2.75$	0.038	0.885
$2.75 < x \leq 3$	0.019	0.923
$3 < x < 3.25$	0.019	0.942
$3.25 < x \leq 3.5$	0.039	0.981
$3.5 < x \leq 3.75$	0	0.981
$3.75 < x \leq 4$	0.019	1
$4 < x < 4.25$	0	1
$4.25 < x \leq 4.5$	0	1
$4.5 < x$	0	1

Table A5.10

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER
PERFORMANCE IN THEIR SECOND YEAR OF SERVICE

KANSAS CITY

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.047	0.047
0 < x < 0.25	0.14	0.186
0.25 < x $\leq$ 0.5	0.047	0.233
0.5 < x $\leq$ 0.75	0.023	0.256
0.75 < x $\leq$ 1.0	0	0.256
1.0 < x < 1.25	0.093	0.349
1.25 < x $\leq$ 1.5	0.07	0.419
1.5 < x $\leq$ 1.75	0.07	0.488
1.75 < x $\leq$ 2	0.07	0.558
2 < x < 2.25	0.093	0.651
2.25 < x $\leq$ 2.5	0.07	0.721
2.5 < x $\leq$ 2.75	0.093	0.814
2.75 < x $\leq$ 3	0.093	0.907
3 < x < 3.25	0.047	0.953
3.25 < x $\leq$ 3.5	0	0.953
3.5 < x $\leq$ 3.75	0	0.953
3.75 < x $\leq$ 4	0.047	1
4 < x < 4.25	0	1
4.25 < x $\leq$ 4.5	0	1
4.5 < x	0	1

Table A5.11

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER
PERFORMANCE IN THEIR THIRD YEAR OF SERVICE

KANSAS CITY

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0.214	0.214
$0 < x < 0.25$	0	0.214
$0.25 < x \leq 0.5$	0.071	0.286
$0.5 < x \leq 0.75$	0.071	0.357
$0.75 < x \leq 1.0$	0.071	0.429
$1.0 < x < 1.25$	0	0.429
$1.25 < x \leq 1.5$	0.143	0.571
$1.5 < x \leq 1.75$	0.071	0.643
$1.75 < x \leq 2$	0	0.643
$2 < x < 2.25$	0	0.643
$2.25 < x \leq 2.5$	0.071	0.714
$2.5 < x \leq 2.75$	0.143	0.857
$2.75 < x \leq 3$	0.143	1
$3 < x < 3.25$	0	1
$3.25 < x \leq 3.5$	0	1
$3.5 < x \leq 3.75$	0	1
$3.75 < x \leq 4$	0	1
$4 < x < 4.25$	0	1
$4.25 < x \leq 4.5$	0	1
$4.5 < x$	0	1

Table A5.12

FREQUENCY AND CUMULATIVE FUNCTION OF RECRUITER PERFORMANCE IN THEIR FOURTH YEAR OF SERVICE

KANSAS CITY

Average Monthly Contracts	Frequency	Cumulative Frequency
0	0	0
$0 < x < 0.25$	0.182	0.182
$0.25 < x \leq 0.5$	0	0.182
$0.5 < x \leq 0.75$	0.091	0.273
$0.75 < x \leq 1.0$	0	0.273
$1.0 < x < 1.25$	0.091	0.364
$1.25 < x \leq 1.5$	0	0.364
$1.5 < x \leq 1.75$	0	0.364
$1.75 < x \leq 2$	0.273	0.636
$2 < x < 2.25$	0.091	0.727
$2.25 < x \leq 2.5$	0	0.727
$2.5 < x \leq 2.75$	0	0.727
$2.75 < x \leq 3$	0.	0.727
$3 < x < 3.25$	0.182	0.909
$3.25 < x \leq 3.5$	0	0.909
$3.5 < x \leq 3.75$	0	0.909
$3.75 < x \leq 4$	0	0.909
$4 < x < 4.25$	0	0.909
$4.25 < x \leq 4.5$	0	0.909
$4.5 < x$	0.091	1

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